E. F. Mahig 25/208

SUBJECT-INDEX

TO THE

CATALOGUE OF THE LIBRARY

OF

THE INSTITUTION OF CIVIL ENGINEERS.

M-Z.

148243
7/2/19

LONDON:
Published by the Institution,
GREAT GEORGE STREET, WESTMINSTER, S.W.
[TELEGRAMS, "INSTITUTION, LONDON." TELEPHONE, "WESTMINSTER 51."]
1904.

LONDON:
PRINTED BY WILLIAM CLOWES AND SONS, LIMITED,
DUKE STREET, STAMFORD STREET, S.E., AND GREAT WINDMILL STREET, W.

Z
5854
I57
Index
v.2

PREFACE.

THE present Index forms a key to the subject-matter of the books, pamphlets, etc., enumerated in the Author-Catalogue of the Library published in 1895; and the references are to that Catalogue. When the heading referred to is the name of an Author, the date of his publication in question is added for the sake of precision, *e.g.*:—

ARCHES.
Treatise on the Oblique Arch. NICHOLSON (P.), 1846.

When the reference is to such a heading as ANONYMOUS, PERIODICAL PUBLICATIONS, or PARLIAMENTARY AND STATE PAPERS, or to an other extensive heading (*e.g.*, INDIA, LONDON, etc.), the page in the Author-Catalogue is added, with the same object; thus—

BRIDGES (RAILWAY).
Bridges to carry a single line of Railway over an occupation road. ANONYMOUS, p. 41.
CANALS (PARTICULAR).
Calcutta Eastern Canals. INDIA, 1883, p. 99.

The abbreviations "Add." and "App." prefixed to a page-number refer respectively to the ADDENDA and the APPENDIX printed at the end of the third volume of the Author-Catalogue.

Digitized by the Internet Archive
in 2007 with funding from
Microsoft Corporation

http://www.archive.org/details/catalogueofindex02instuoft

CATALOGUE OF THE LIBRARY

OF

THE INSTITUTION OF CIVIL ENGINEERS.

SUBJECT-INDEX.

(TO DECEMBER, 1894.)

M—Z.

MACE. Royal Society Mace, History. WELD (C. R.), 1846.

MACHINE TOOLS. ARMENGAUD, 1847–82; BAKER (T.), 1867; DIXON, 1888; HUTTON (F. R.), 1885.

Cutting Tools worked by Hand and Machine. SMITH (Robert H.), 1882.

Electro-magnetic machine tools. ROWAN (F. J.), 1887, p. 134.

Gauging and measuring instruments, hand-cutting tools, etc. SHELLEY (C. P. B.), 1873 and 1883.

Improved Machine Tool for turning Crank-pins of Locomotives. LAKE (W. R.), 1888.

Machine Bolting. BARENDT, 1883.

Machinist, embracing Lathe-work, Vise-work, Drills, etc. ROSE (J.), 1882 and 1885.

MACHINES AND MACHINERY. ANONYMOUS, 1831, p. 58; BACH, 1881; BALE, 1884; DWELSHAUVERS-DERY, 1871, '72; LANGSDORF, 1826–28; LEUPOLD, 1724, '25; RANKINE (W. J. M.), 1869; RUHLMANN (M.), 1862–75, '85; ZONCA, 1621.

Application of graphic methods to the determination of efficiency of machinery. JENKIN, 1877.

MACHINES AND MACHINERY—*continued.*

Architecture of machinery. CLEGG (S.), Jun., 1842.

Cheap production and increased employment. SOCIETY for the diffusion, etc., 1831. App. 577.

Choice of machinery for use on Engineering Works. MATHESON, 1879.

Coins. CALLON, 1873–77.

Construction and working of Machinery. ABEL (C. D.), 1860.

Construction of Machines. ARMENGAUD (J. E.), 1863–65; KELLER (K.), 1874, '81; LANZ and Bétancourt, 1819, 1820. App. 565; MÜLLER (C.), 1866; REDTENBACHER, 1861; REICHE (H. von), 1869–71; TOMKINS (E.), 1886; UHLAND, 1879–86; WARR (G. F.), 1851; WARREN (S. E.), 1877.

Construction of Machines and Mechanics of Engineering. WEISBACH (J.), 1877–83.

Constructor: a handbook of Machine design. REULEAUX (F.), 1865. 1894.

Design (Machine). UNWIN (W. C.), 1877, '82, '91.

Design and construction (Engineers' Sketchbook of Mechanical Movements). BARBER (T. W.), 1889.

Designs for Machines. LEBLANC, 1844, '60.

Details of Machinery. CAMPIN, 1883.

Dictionary of Machines. APPLETON (D.), 1857.

Economy of Machinery. BABBAGE (C.), 1832.

Elementary treatise. HACHETTE, 1811.

Elements of Machine Design. KLEIN (J. F.), 1889.

Export of Tools and Machinery, Report on Laws, 1825. PARLIAMENTARY .. Papers, p. 486.

Farm Engineer, a treatise on barn machinery. RITCHIE (R.), 1849.

Friction of parts. COULOMB, 1821.

Friction reduced. GILL (T.), 1839.

Handbook of Machinery. APPLEBY Brothers, 1869, 1877.

Hoisting Machinery, Mechanics of, including accumulators, excavators and pile-drivers. WEISBACH (J.) and Herrmann, 1893.

Hydraulic, steam, and hand power lifting and pressing machinery. COLYER, 1884, '92.

Imperial Cyclopædia. JOHNSON (W. & J. H.), 1850.

Manufacture of Interchangeable Mechanism. FITCH, 1883.

Kinematics of Machinery. KENNEDY (A. B. W.), 1878; REULEAUX (F.), 1876.

Labour-saving Machinery. SAMUELSON (J.), 1893.

MACHINES AND MACHINERY—*continued.*

Labour. Utility, etc., of machines to shorten labour.
ANONYMOUS, 1780. Add. 481.

Machinery and Tools at the end of the 18th century.
BRUNTON (W.), 1850.

Machinery of the Nineteenth Century. DEMPSEY, 1852.

Mechanics of Machinery. KENNEDY (A. B. W.), 1886; WEISBACH 1847–8.

Mechanics of the Machinery of Transmission. WEISBACH, 1883.

Net cost of Machines in France, England and Germany.
PERISSÉ, 1884.

Portefeuille économique des machines.
PERIODICAL Publications, p. 21.

Power definition of mechanical power in the practical use of Machinery. HAVILAND, 1846.

Power of Machines. BANKS (J.), 1803.

Rating of Machinery. HEDLEY (T. F.), 1883; POTTS (J.), jun., 1879.

—— Report on Rating of Machinery Bill, 1887.
PARLIAMENTARY .. Papers, p. 486.

Repair and maintenance of Machinery.
BARBER (T. W.), 1895. Add. 483.

Theatrum Machinarum Universale. HORST & Polley, 1737–74.

Working Drawings and Designs in Machine Making.
BURN (R. S.), 1864–68. Add. 489.

—— Portfolio of working drawings of the most important parts.
BUSBRIDGE, 1882.

Working parts of Machines. FERNIQUE, 1882.

Babbitt's patent lined bearings of Machines and Machinery. Report. BABBITT, 1847.

Bramah and Robinson, Drawings of Machinery, etc., designed and constructed by. BRAMAH and Robinson, 1825. Add. 489.

Jacquard Machine, history. KOHL (F.), 1872.

Janvier's machines, Collection of.
JANVIER, (A.), 1827. App. 563.

Papin (D). PAPIN, 1695. App. 571.

Perforating Machine (Roberts, Fothergill and Dobinson).
FOTHERGILL (B.), 1848.

Académie (L') Royale des Sciences, Machines and inventions approved by (1666–1754). GALLON (Col.), p. 558.

Albany, Townsend Machine Shop. Description.
TOWNSEND (F.), 1870.

MACHINES AND MACHINERY—*continued.*

American Machinist. PERIODICAL PUBLICATIONS, p. 9.

—— Modern Practice of American Machinists and Engineers. WATSON (E. P.), 1869.

Boston Machinist. FITZGERALD (W.), 1868.

Philadelphia, Machinery at. PHILADELPHIA, 1876, p. 33.

Seraing. Machines constructed at the establishments. COCKERILL, 1859.

United States. Industry in Machinery, etc. WHITWORTH (Sir J.), and Wallis (G.), 1854.

MAGNETISM. ADAMS (G.), 1784; AIRY (Sir G. B.), 1869, p. 23; ANONYMOUS, p. 48; BECQUEREL (A. C.), 1834, 1846; BREWSTER, 1838; CARRUTHERS, 1888; CAVALLO, 1795; COULOMB, 1785–89; GUILLEMIN (A.), 1891; GUTHRIE (F.), 1880; HARRIS (Sir W. S.), 1850, '72; JENKIN, 1878; MASCART and Joubert, 1882, '83; MAYCOCK, 1891; PERIGRINUS, 1558. App. 571; QUETELET, 1841; SCORESBY (W.), 1832–33; SMITH (Willoughby), 1885; STEWART (Balfour), and Gee, 1885–87; THOMPSON (S. P.), 1882; VASCHY (A.), 1890; WEBER (Wilhelm), 1892–94.

Annals of Electricity, Magnetism, etc. PERIODICAL PUBLICATIONS, p. 11.

Application of, to the cure and alleviation of disease. DARLOW, 1876.

Arago's experiments: Magnetism manifested by various substances during the act of rotation. BABBAGE and Herschel, 1825.

Attraction, Origin of Magnetic. POPE (W.), 1829; POPE (W.), 1829. App. 572.

—— Magnetic Attractions. BARLOW (P.), 1824.

Bridge, Magnetic, or Balance for measuring Magnetic Conductivity. EDISON, 1887.

Chemical Affinity, Electricity and Magnetism illustrated by a noiseless Dynamo requiring no steam power. ROSS (O. C. D.), 1891.

Determination of the Magnetic elements at the Physical Laboratory, University of Sydney. FARR, 1892.

Diagrams representing the diurnal change. AIRY (Sir G. B.), p. 16.

Diamagnetism and Magnecrystallic action, including the question of diamagnetic polarity. Researches. TYNDALL (J.), 1870, 1888, p. 335.

MAGNETISM—*continued.*

Dictionary. JACQUEZ, 1883.

Disturbances, Magnetic, recorded by the self-registering magnetometers. AIRY (Sir G. B.), 1868, p. 16 ; AIRY, Sir G. B., 1870, p. 18.

—— Dec. 14th, 1862. STEWART (Balfour), 1863.

Electricity, Magnetism and. ANGELL (J.), 1882 ; MAXWELL, 1873, '92 ; THOMSON (Joseph J.), 1893 ; WORMELL (R.), 1882.

Equations applying to Light under the action of Magnetism. AIRY (Sir G. B.), 1846, p. 20.

Errors, Magnetical, compensations and corrections. AIRY (Sir G. B.), 1865, p. 19.

Induction in Iron and other Metals. EWING, 1891.

Knight's magnetic bars, Use of. KNIGHT (G.), 1758. App. 564.

Lag (Magnetic). BLAKESLEY, 1888.

Laws of magnetism, Discovery of. WHISTON (W.), 1721. App. 580.

Magnetic measurements. NIPHER, 1887.

Magnetical Instructions for the use of portable instruments adapted for magnetical surveys, etc. RIDDELL (Lt. C. J. B.), 1844.

Magnetical Investigations. SCORESBY (W.), 1844–52.

Magnetism, Galvanism, etc. Scientific Researches. STURGEON (W.), 1852.

Magnets. ANONYMOUS, 1687. App. 545 ; GILBERT (W.), 1600 ; PIHL (O. A. L.), 1878.

—— Directive power of large steel magnets. AIRY (Sir G. B.), 1872, p. 16.

Magnets. New form of permanent magnet. PAGET, 1869.

—— Character of steel used for permanent magnets. PREECE, 1890.

—— Nature of the force by which bodies are repelled from the poles of a magnet. TYNDALL (J.), 1855, p. 335.

Mathematical theory of Magnetism. WATSON (H. W.) and Burbury, 1885.

Metaphysics of Magnetism. CHARPIGNON, 1848.

Observations. British Colonial Magnetic Observatories. SABINE (Sir E.), 1843–51.

—— Magnetic Observatories. Report. HERSCHEL (Sir J. F. W.), 1855, p. 51.

—— New method for the discussion of Magnetic Observations. BIGELOW (F. H.), 1892.

MAGNETISM—*continued.*

Observations. Magnetical and Meteorological Observations, system of simultaneous. BRITISH Association, 1845.

—— Adria (Coasts of). LASCHORER and Kesslitz, 1892.

—— Athabasca (Lake) and Fort Simpson, &c. Magnetical and Meteorological Observations. LEFROY, 1855.

—— Cape Observatory, Magnetical Observations, 1841–50. CAPE TOWN.

—— Greenwich Observatory. Magnetical Observations, 1836, etc., 1840–47. GREENWICH Observatory.

—— —— Results, 1848–58. GREENWICH Observatory.

—— Hobart Town. Observations, 1843–1850. HOBART TOWN.

—— Stonyhurst College Magnetical Observations. Results. STONYHURST Coll., 1866, etc.

—— Toronto Observatory. Abstracts and results of magnetical observations from 1841–71. TORONTO.

Polarity and Diamagnetic Force, Researches on. TYNDALL (J.), 1855, p. 335.

Storms (Magnetic), analysis. AIRY (Sir G. B.), 1863, p. 17.

Technology of Magnetism. FERRINI, 1879.

Terrestrial Magnetism. AIRY (Sir G. B.), 1850; CARRUTHERS, 1888; PFAFF, 1817. Causes and phenomena. WILDE (H.), 1890. Cosmical features. SABINE (Sir E.), 1862.

—— Comparison of certain traces produced simultaneously by the self-recording magnetographs at Kew and at Lisbon. CAPELLO and Stewart, 1864.

—— Daily variation of the horizontal and dipping needles. BARLOW (P.), 1823. Add. 547.

—— Magnetic Disturbance of July 15th, 1863. CAPELLO and Stewart, 1864.

—— Diurnal inequalities. AIRY (Sir G. B.), 1868, p. 20.

—— Fox's Dipping-needle Deflector. FOX (R. W.), 1834.

—— Dip and intensity in parts of England, Ireland and Wales. FOX (R. W.), 1835.

—— Magnetic Survey of Canada, chiefly the North-Western Territories. LEFROY, 1883.

—— Periodicity in the elements. AIRY (Sir G. B.), 1872, p. 18.

—— Report. BRITISH Association, 1840.

—— Results deducted from the measures of Terrestrial Magnetic Force in the horizontal plane. AIRY (Sir G. B.), 1885, p. 23.

MAGNETISM—*continued.*

Australia. Magnetic Research in a voyage to Australia.
SCORESBY (W.), 1859.

India. Magnetic Survey. SCHLAGINTWEIT (A. and R.), 1856.

See also COMPASS (Magnetic).

MAN.

Antiquity of man, reply to geological evidences. WHITLEY, 1880.

Moral and intellectual constitution of.
BRIDGEWATER Treatises, 1.

Physical constitution of. BRIDGEWATER Treatises, 2.

MANGANESE, Oxide of, method of recovering, as practised at Dieuze, near Nancy. BELL (Sir I. L.), 1867, p. 119.

MANUFACTURES.

Cost of. METCALFE (H.), 1885.

Distress (Manufacturing), effect on manufacturing progress.
CHADWICK (Sir E.), 1864, p. 235.

Economy of manufactures. BABBAGE (C.), 1832.

Progress of foreign manufactures. SYMONS (J. C.), 1839.

American manufactures. History, 1608 to 1860.
BISHOP (J.), 1868.

British Manufacturing Industries. BEVAN (G. P.), 1876.

—— British and foreign industries and manufactures. The cause and cure of altered relations. STEVENSON (D.), 1869.

—— Manufactures and machinery of Great Britain.
BARLOW (P.), 1836.

—— Manufactories and Mechanical Arts of the United Kingdom.
NICHOLSON (J.), 1830.

Lancashire and Cheshire, Manufactures and Commerce in.
FAIRBAIRN (Sir W.), 1869, p. 403.

Switzerland, Manufactures of. BOWRING (J.), 1836. App. 549; SWITZERLAND, 1836.

United States Manufactures. Reports and Statistics.
UNITED States, 1882 and 1884, p. 350.

See also ARTS AND MANUFACTURES, COMMERCE, TRADE.

MANURES.

Artificial Manures. Tests for their purity.
ROBINSON (John), M.B., 1844, 1863.

Peruvian Guano, properties. NESBIT, 1856.

MAPS (Map Making).

Cartographic Applications of Photography. Report. Waterhouse (Lieut. J.), 1870.

Cartography. Carusso, 1886.

Construction of Maps. Jamieson (A.), 1814.

Construction and use of the six sheets of marginal lines for Maps of all the World. O'Farrell, 1862.

Formulas and tables to facilitate the construction and use of maps. Woodward (R. S.), 1889.

Outline of a method of Model Mapping. Denton (J. B.), 1841.

Plain and Ornamental Mapping and Engineering Drawing. Wilme (B. P.), 1841.

Projection by balance of errors for maps. Airy (Sir G. B.), 1861, p. 17.

MAPS (Atlases).

Atlas. Anonymous, 1862, p. 40.

Atlas of Ancient Geography. Arrowsmith, (S.), 1838.

Atlas of modern classical and celestial maps. Anonymous, 1859, p. 42.

General pocket Atlas. Andree, 1881.

Handy reference Atlas of the World. Bartholomew (J.), 1887.

Imperial Atlas of Modern Geography. Blackie (W. G.), 1860.

Pictorial maps for the illustration of the land, the sea and the heavens. Bannister (S.), 1849.

Pocket Atlas of the World. Perthes, 1885; Rand, MacNally and Co., 1886.

Royal Atlas of Modern Geography. Johnston (A. K.), 1869, '83, '89.

MAPS (General References).

Accrington, Plan of the Borough. Newton (W. J.), 1890.

America, Central, Map, shewing lines of Atlantic and Pacific communication. Wyld (J.), 1850.

Austria-Hungary. Carusso, 1887.

Belgium. Brussels, 1879.

Bengal, Behar and Benares, 1841. India, p. 110.

Bombay. Addis (W. J.), 1866.

Boulogne-sur-Mer and its environs. Hopkins (R. and R.), 1844.

Bradford, plan. Bailey (S. O.), 1880.

Brazil. Minaes Geraes. Chrockatt de Sa and Thompson, 1893.

Brazil (South). Gierth, 1883.

Bristol, Clifton and the Hot Wells. Donne, 1831.

MAPS (General References)—*continued.*

British Isles. Atlas. Bacon, 1883.
—— Hydrographical Map. Petermann, 1866.
Canada, Upper and Lower. Canada, 1840, p. 216.
Canterbury, New Zealand, Topographical Map. Canterbury, N.Z.
Cape Colony. Cape Colony, p. 220.
Chicago, 1858. Graham (J. D.)
China. Atlas. Richthofen (F. von), 1885.
Dublin, County of. Duncan (W.), 1821.
Düsseldorf. Railway Map, 1880. Iron and Steel Inst.
England and Wales, Map. Arrowsmith, A., 1815.
—— Philips's New Map. Shawe (W.), 1888.
—— Six Home Counties. Norden.
—— Books of Maps, taken from Ogilby, Bowen and Price. Willdey (G.), 1714.
Europe. Germany, France, Italy, Austria, Hungary, Poland and Denmark. Kloden, 1813.
France. Maps of the French Empire, Repertory. Koninklijk Instituut van Ingenieurs, 1856.
Grimsby, Great, Plan, 1880. Great Grimsby.
Hindoostan. Rennell (J.), 1793.
Hobson's Bay, Silting up of. Hobson's Bay, 1869.
India, 1842. Allen (W. H.), and Co.; India, p. 98.
—— Catalogue of Maps of the British possessions in India and Asia, 1874. India Office.
Ireland, Tramway Map, 1884. Ireland, p. 143.
Ireland and England Communication. Charts and Plans referred to in Telford's Report on. Telford (T.), 1809, p. 286.
Isle of Man from a Trigonometrical Survey. Drinkwater, 1826.
Kattywar, Province of, 1856. India, p. 121.
Leipzig. Plan. Priber, 1870.
Liverpool Bay Survey. Hills (G. H.), 1866–74.
London. Smith (Chas. and Son), 1889.
—— London and its Environs. London, 1877. Add. 516.
—— Topographical Map. Mylne (R. W.), 1851. Map of the Contours. Mylne (R. W.), 1856.
—— Levels taken by Commissioners of Sewers. Wyld (J.)
—— Ordnance Atlas. Bacon, 1885.
—— London and Westminster, 1803. London, p. 253.
Manchester. British Association, 1887, p. 182.
Melbourne and Suburbs, Half-scale Contour Maps. Melbourne.

MAPS (General References)—*continued.*

Mersey and Irwell and their tributaries, 1877. Irwell River.

Monmouthshire. Cary, 1828.

—— Plan of Monmouthshire, Gloucestershire (part) and Glamorganshire. Kirby, 1864–65.

Natal, Colony of, surveyed in 1861. Grantham (J.)

New Plymouth, New Zealand. Plan. Carrington (F. A.)

Newport, Caerleon, and Maindee Plan. Kirby (C.), 1864–65.

New Zealand. Maps and sections illustrating the several plans for connecting Port Lyttelton with the Canterbury Plains. Canterbury, N.Z.

Nicaragua. Squier (E. G.), 1851.

Nord-Ostsee Kanal. Jahn, 1886.

Nottingham, Plan of town and County. Jackson (F.), 1861.

Otago province. Stokes (Capt. J. L.), 1866.

Oxford, City of. Hoggar, 1850.

Panama Isthmus. Map. Wyse (L. N. B.), and Reclus, 1879.

Paris, City and suburbs. Deharme and Desnos, 1788.

Peru, Geographical Atlas. Paz Soldan (M. F.), 1865. Add. 527.

Seine-et-Oise Department, Map. Seine-et-Oise, 1850.

Spain. Coasts on the Mediterranean, and the opposite coasts of Africa. Sea Charts. Tofiño de San Miguel, 1787–9.

Stellaland (South Africa). Lavertine, 1884.

Suez Canal, Lower Egypt, Sudan, Tunis, and the Province of Constantine, Algeria, Alexandria, Maps. Royal Engineers, 1882.

Soonderbuns, 1831. India, p. 132.

Turkistan, Maps. Turkistan, 1879.

United States. American Soc. of Civil Engineers, 1893.

—— Alphabetical Index to the Map. Tanner (H. S.), 1835.

—— Atlases of Colorado and Wisconsin. United States, 1877, 1876, p. 347.

—— Maps, Charts, etc. United States, 1883, p. 345.

Vienna. Vienna, 1880.

World. Chart on Mercator's projection. Berghaus, 1886.

MAPS (Agricultural).

France. Delesse, 1862.

New South Wales, Mineral, Pastoral and Agricultural. Tayler (J.), 1875.

Paris environs. Delesse, 1874.

Seine et Marne. Delesse, 1880.

MAPS (Commercial).

United States, Commercial Map. Rand, MacNally and Co.

MAPS (Electric Light).

London, Map showing the areas granted to the Electric Light Supply Companies. Stanford (E.), 1890.

MAPS (Geological).

America (North and South), Catalogue of Geological Maps, 1752–1881. Marcou (J. M. and J. B.)

Australia. Part of Western Australia, showing progress of geological survey. Brown (H. Y. L.), 1872.

—— South Australia. Hundred of Barossa, tertiary deposits. South Australia, 1889.

Bath, Freestone district. Randell and Saunders, 1850.

Buckinghamshire. Smith (William), 1824.

Canada, Dominion of. Map geologically coloured. Canada, p. 216.

—— Plans of Lakes and Rivers between Lake Huron and the River Ottawa. Canada, 1857, p. 217.

Dover, Straits of. Map showing the cropping out of chalk between France and England. Larousse, Potier and Lapparent, 1877.

England, S.E., Geological Map of. Whitaker (W.), and Topley, 1870.

France. France, p. 436.

Great Britain. Smith (William), 1815.

Kent, Surrey and Sussex, Geological Map, 1868. Kent.

London. Geological and Topographical Map. Mylne (R. W.), 1858.

Ohio, State of. Andrews (E. B.), and Ballatine, 1870.

Paris. Delesse.

Switzerland. Fritsch, 1873.

Yorkshire. Smith (William), 1821.

See also Geology.

MAPS (Hydrographical, etc., Rivers, Canals).

Admiralty, Catalogue of Charts, plans, views and sailing directions, 1855–57. Parliamentary..Papers, p. 464.

Construction of Sea-charts. Beautemps-Beaupré, 1823.

Hydrographic Charts. Observations to rectify. Verdun de la Crenne, 1778. App. 579.

Maritime Atlas. Bellin, 1764.

Method of laying down a ship's track on sea charts. Hall (Basil), 1820.

America, North. Voyage made in 1750 and 1751 in, to rectify the charts of the coasts of Acadia, Royal Island? and Newfoundland, etc. Chabert (Marquis J. B. de), 1753. App. 551.

Atlantic (North) Ocean, Pilot Chart of. Atlantic Ocean, 1888.

MAPS (Hydrographical, etc., Rivers, Canals)—*continued.*

Baffin Bay to Lincoln Sea, Polar Regions. America, 1885
Belgium. Navigable Routes in 1893.
Belgium, 1894. Add. 484.
Bengal, Bay of, Orissa Coast, etc. Hammond (G. C.), 1878.
Bohemia. Hydrographical Map. Harlacher, 1878.
Chicago, Harbour and Bar, Illinois. Graham (J. D.), 1857.
Clyde, longitudinal section, 1758–71. Deas, 1871.
Danube between Braila and the Sea, 1870–71.
Hansford and Kuhl.
Dutch Rivers. Holland, 1879.
English Canals and Navigations. Anonymous, p. 41.
—— Canals, Navigable Rivers, Railways in England.
Bradshaw (G.), 1820.
—— River Basins in England and Wales in County Council groups. De Rance, 1893.
—— Canals and Navigable Rivers of England and Wales.
Wells (L. B.), 1894.
Fenland, Drainage of the. Gibbs (L.), 1888.
France, Collection of Maps of the Ports of. Ayrouard, 1736.
—— Canal routes in the interior of France. Delaistre, 1812.
German waterways, map. Germany, 1889.
Glasgow, Harbour of, and section of Clyde. Deas, 1876.
Great Britain, canals and rivers of, and also direct roads.
Smith (C.), 1815.
India. Mountains and river basins of India.
Saunders (T.), 1870.
—— Karáchi, Harbour of, 1892. India, p. 120.
Lincolnshire and Norfolk Estuary, outfalls of the rivers Witham, Welland, Nene and Ouse. Frow, 1866.
Liverpool and Chester Rivers and of the coast and harbours to Holyhead, Chart. Evans (T.), 1821.
London, Country 24 miles round. Mogg (E.), 1817.
Mersey and Irwell and their tributaries, 1877. Mersey.
New South Wales. Map of Drainage Area of the Murray River.
McKinney, 1891.
Nicaragua Ship Canal. Route. Childs (O. W.), 1852.
N.W.P. and Oudh, Canals in progress and proposed.
India, p. 127.
Orleans, of Briare and of Loing, Canals of. Orleans, 1739.
Shannon River. Travellers' map. Grantham (J.), 1830.
Thames, mouth of the, to the Severn. Anonymous, 1798, p. 49.
—— from the source to the sea. Bowles (C.), 1787.
Trent, lowlands draining through the. Gibbs (L.), 1888.
Tyne River. Gardiner, 1796.

MAPS (MILITARY).

Army Maps, United States. Civil War, 1863–5.
UNITED States, p. 341.

—— Military Maps explained. HUTCHINSON (H. D.), 1886.

Battlefield of Gettysburg. GETTYSBURG, 1876.

MAPS (MINES).

Lydenburg Goldfields. LOVEDAY, 1883.

Queensland Mines. QUEENSLAND, 1886, p. 71.

MAPS (ORDNANCE).

Ordnance Survey. As they are and as they ought to be.
CROOK, 1892.

Liverpool. Trigonometrical plan of the town and port of Liverpool, including the environs. GAGE, 1836.

MAPS (PHYSICAL).

Physical Atlas. JOHNSTON (A. K.), 1856.

Brazil. Subsidies towards the formation of the Physical Map.
MELLO (H. DE), 1876.

Queensland. Rainfall. QUEENSLAND, p. 71.

Victoria. Map showing the distribution of Forest Trees.
EVERETT, 1866.

MAPS (RAILWAYS).

Bhor Ghat Incline on the south-eastern line of the Great Indian Peninsular Railway. WEST (A. A.), 1866.

Birmingham to Rugby and Birmingham to Wolverhampton.
CHEFFINS (C. F.), 1837.

Canada. CANADA, 1882, p. 218.

Croydon Canal and Railway. Plan. GRANTHAM (J.), 1811.

England (South). Great Western and other Railways, 1850.
GREAT Western Railway.

—— England and Wales. AIREY, 1890.

—— England and Scotland. CHEFFINS (C. F.), 1844.

France. Railways. HAGENBUCH, 1847.

Great Britain. Railways. SMITH (Chas.) and Son, 1845.

—— Station Map of the Railways in Great Britain.
MACAULAY (Z.), 1862.

India. East Indian Railway. INDIA, p. 105.

Liverpool, Grand Junction, Manchester and Bolton Railways.
WYLD (J.), 1839.

London. Station Map of the Metropolitan Railways.
MACAULAY (Z.).

—— Metropolitan Railways and Tramways Map.
STANFORD (E.), 1878.

—— London and Birmingham, Railway Map. WYLD (J.), 1839.

MAPS (RAILWAYS)—*continued.*

London. London and Birmingham. Railway from London to Boxmoor. CHEFFINS (C. F.), 1837.

—— Railway communication from London to the North. CHEFFINS (C. F.), 1840.

New Zealand, North and Middle Islands, showing Railways proposed and authorised, 1878. NEW ZEALAND, p. 412.

Paris to Orleans, Railway from. DONNET, 1842.

Persia, Railways in. STEPHENSON (Sir R. M.), 1878.

Queensland, New South Wales, Victoria and South Australia Railways system. STANLEY (H. C.), 1880.

Scotland. AIREY, 1888.

Virginia and Tennessee Railroad. BLACKFORD, 1856.

MAPS (ROADS AND BRIDGES). Scotland. SCOTLAND, 1807.

MAPS (STATISTICAL).

Statistical Maps in relief. VAUTHIER, 1878.

Canterbury, New Zealand. CANTERBURY, N.Z.

England, Scotland and Ireland, Statistical Atlas. BEVAN (G. P.), 1882.

MARBLE. Marble Workers' Manual. BOOTH (M. L.), 1876.

MARBLE QUARRIES. Egypt. Explorations at Gebel-Geneffe. GUITER, 1871.

MARINE.

Marine and Fisheries Department, Canada. Reports. CANADA, 1869–86, p. 217.

Marine Board Examinations, Sunderland. Engineers' Handbook to. REED (T.), 1879.

Marine Department, Madras. Report 1859–60. INDIA, p. 123.

Mercantile Marine Service Association. Report, 1863. MERCANTILE.

MARINE ENGINES AND BOILERS.

American Society of Naval Engineers. AMERICAN Soc. of N. E.

American, Modern, Marine Engines, Boilers, etc. EDWARDS (E.), 1881.

Arrangement of a Marine Engine. ANONYMOUS, 1888, p. 54; DU BUIT and Sabathier, 1886.

Bergen's Marine Engineer and Guide Book to the Board of Trade Examinations. METCALFE (M.), 1884.

Boilers. Accidents to Boilers, 1887, Returns of Passenger Steamers. PARLIAMENTARY..Papers, p. 467.

—— Apparatus employed for navigation. DU TEMPLE (L.), 1860. Add. 497.

—— New construction of Marine Boilers to effect the economy of Fuel on board Steam Vessels. RENTON (A. H.), 1846.

MARINE ENGINES AND BOILERS—*continued.*

Boilers. Marine boiler construction, etc. Rowe (John A.), 1885.

—— Marine Boiler Construction, etc., treated from an electro-chemical point of view. Rowe (John A.), 1884.

—— Marine Boiler construction and management. Stromeyer (C. E.), 1893.

—— Causes and remedies. Corrosion in Marine Boilers. Hallett (J. H.), 1884.

—— Steam-generating power of Marine Boilers. Williams (C. W.), 1864.

Construction and classification of Marine Engines. Atherton, 1851.

—— Theory and practice of construction. Jullien (C. E.), 1862; Widmann (E.), 1888, '90.

Double Expansion Marine Engines. Allen (E. E.), 1855.

Economy and efficiency. Anonymous, 1870, p. 46.

Elementary lessons. Langmaid and Gaisford, 1893.

Engineers of the Royal Navy. Anonymous, 1859, p. 45.

Engineer's Guide to the Royal and Mercantile Navies. Anonymous, 1856, p. 45.

Glossary of Terms with French and Spanish Translations. Quesada (T. G.), 1870.

"Gorgon" and "Cyclops," Engines on board, described with remarks on the advantages of long and short stroke connecting rods, etc. Seaward (J.), 1840.

Handbook of Marine Engines. Roper (S.), 1883.

Horse power. Gustaffson, 1847; North East Coast Inst., 1888.

Improvements of Locomotive Engines for Propelling Vessels. Bodmer (J. G.), 1841.

Lectures. Fréminville, 1860.

Management of Engines. Report of Committee on the, in Ships of War, 1877. Parliamentary..Papers, p. 489.

Marine Engineer. Bergen, 1880.

Marine Engineering. Burgh (N. P.), 1869; Redman (J. B.), 1877; Seaton (A. E.), 1883, 1891.

—— Pocket book of rules and tables. Seaton (A. E.) and Rounthwaite, 1894.

—— Progress and development. Parker (Wm.), 1886.

—— Recent Practice. Maw, 1883.

—— School of Paris. Report of proceedings. Bussy, 1890.

—— Tables and formulas for Marine Engineers. Proctor (F.), 1882.

—— Marine Steam Boilers, Use of Steam Coals in. Armstrong, Longridge and Richardson, 1858.

—— Marine Steam Engine. Busley, 1892; Gordon (W.) 1845; Main and Brown, 1857, '60, '63; Sennett (R.), 1882 and 1885.

—— Marine Engines and Boilers. Holmes (G. C. V.), 1889.

MARINE ENGINES AND BOILERS—*continued.*

Marine Steam Engines. GUSTAFFSON, 1847. Rules for calculating their power. ARMSTRONG (R.), 1870. Commercial economy of working steam expansively. ALLEN (E. E.), 1855.

Marine Steam Machinery, Guide to its use. DONALDSON (J.), 1885.

Modern Marine Engines. BURGH (N. P.), 1864; BUSLEY, 1884.

Perkins. Correspondence between the Admiralty and Messrs. Perkins in reference to their System of Engines and Boilers, 1873–78. PARLIAMENTARY..Papers, p. 489.

Portfolio of photographs, Marine Engines, Boilers and Machinery. MAUDSLAY, Sons and Field, 1892.

Power, Marine Engine, measuring and registering. BRITISH Association, 1857.

Principles and mechanical detail of Marine Steam-engine. WILLIAMS (Commander W. J.), 1839.

Relative Merits of Simple and Compound Engines as applied to Ships of War. McDOUGALL, 1875.

Report, Amended, by Committee. PARLIAMENTARY..Papers, p. 477.

Russian Ironclad "Nicolas I." three-cylinder disconnecting marine engine for. ANONYMOUS, 1888, p. 54.

Stationary and Marine Engines with high pressure steam. BODMER (J. G.), 1845.

Steamboats, boiler. SCHWARZ-FLEMMING, 1873.

Study of Marine Engine. SAXBY (S. M.), 1862.

Treatise, rudimentary. MURRAY (R.), 1858.

United States. Marine Steam Boilers. BARTSCH, 1851.

—— Marine and Steam Vessels, merchant service. FITCH, 1888.

MARINE MACHINES. BIENAYMÉ, 1887.

MARINE PROPELLER (PERKINS'). HAWKINS (J. I.), 1843.

MARINE SURVEYING. ROBSON (T. C.), 1834. Liverpool Bay. HILLS (G. H.), 1867–75.

Application to the practice of Civil Engineering. STEVENSON (D.), 1842.

India. Charts of Marine Survey. TAYLOR (A. D.), 1881–82.

MARINE WORKS. BOUNICEAU, 1866.

Building in water. A treatise. SEMPLE (G.), 1776, 1780.

Construction of, with concrete bags and on the plant used for their deposit. CAY, 1888.

Italy. ITALY, p. 147. Marine Constructions. PEREZ DE LA SALA, 1871, '86.

Use of natural blocks, manufacture of artificial blocks, and immersion of both kinds. LATOUR and Gassend, 1860.

MARITIME CONFERENCE. Brussels, 1853. BRUSSELS.
Maritime Congress (International), London, 1893.
INTERNATIONAL M. C.

MARKETS.
Designs for the Construction of Markets, Warehouses and Sheds. FRIEDMANN, 1877.
Dublin Cattle Market. Proposed general market. HEMANS, 1860.
Islington Cattle Market Plan. GRANTHAM (R. B.), 1850.
Leeds Cattle and Fish Markets. LEEDS, 1882.
London. Abuses and Advantages of a Central Cattle Market fairly considered, 1850. LONDON, p. 262.
—— Proposed central Meat Market, 1851. LONDON, p. 262.
—— London Central Markets Act, 1886. LONDON, p. 262.
—— Notice of Metropolitan Markets. JONES (Sir Horace), 1878.
—— Proposed New Cattle Market to be erected near Blackwall. WILSON (W.), 1851.
—— Shall the London Cattle Market be central or suburban? LENS, 1851.
—— Paddington Market Act, 1883. PADDINGTON Market.
Paris. Central markets. BALTARD and Callet, 1872–73.
Reading. Report. READING, 1847.

MARSHES.
Hydraulic improvement of marshy lands. BOCCI, 1891.
Italy. ITALY, p. 147. Improvement of the Pontine lands. NICOLAI, 1800; PRONY, 1822–23.
—— Ex-kingdom of Naples. Improvement. NAPLES, 1876.
—— Rome. Amelioration. AMENDUNI, 1884.
—— —— Agro Romano. CANEVARI, 1874.
—— Tuscany. Improvement. BACCARINI; MARCHETTI (A. S.), 1861; TARTINI, 1838. Hydraulic operations, 1859–60. MARCHETTI (A. S.), 1861.

MASONRY. CLAUDEL and Laroque, 1859.
Ancient Masonry, Theory and Practice. LANGLEY, 1736.
Construction (Masonry). BAKER (J. O.), 1890; BOIX (E.), 1889; ESPINOSA, 1859.
Practical Masonry. ANONYMOUS, 1830, p. 52.
Stabilityof masonry arches. BONNIN (R.), 1875.
Stone Cutting, Masonry and. Treatise. DOBSON, 1842.
Tables for taking out quantities. BELLAMY, 1873.

MASSAGE. Instructions in. YOUNGER (D.), 1890.

MATERIALISM refuted by Facts. BROWNE (H. J.), 1884.

MATERIALS AND CONSTRUCTION. CAMPIN, 1881; VECCHIO, 1884.

Engineering Works. Notes on the materials used in the construction. WRAY (H.) and Smith, 1879–81.

MATHEMATICS (GENERAL REFERENCES). BELL (A.), 1847; DAVIDSON (J.), 1817; GREGORY (O.), 1825, '48; GUGLIELMINI, 1719; NEVE, 1708.

Adjustment Formulas. DE FOREST, 1877.

—— Repeated adjustments and signs of residuals. DE FOREST, 1878.

American Journal of Mathematics. PERIODICAL PUBLICATIONS, p. 9.

Applied to the useful and fine arts. DUPIN, 1854.

Arenarius of Archimedes. RIGAUD (S. P.), 1837. App. 573.

Artillery, Corps of, Mathematics for the. BEZOUT, 1795–99.

Belgium, History of Mathematics in. QUETELET, 1864.

Cayley, Mathematical Papers. CAYLEY, 1852–67, 1889–93.

—— List of Cayley's Mathematical Works, 1841–62. CAYLEY.

Collections, Mathematical, and Translations. SALUSBURY (T.), 1661.

Collection of mathematical questions which have been published in the Ladies' Diary, 1704–1760, with Solutions. SOCIETY of Mathematicians, 1774.

Compendium, Mathematical. MOORE (Sir J.), 1681. App. 569.

Course of Mathematics. HUTTON (C.), 1803–4, '33.

Course of mathematics for the use of naval officers. BÉZOUT (E.), 1798–99. App. 548.

Curious works, Collection of, on Mathematics. GROLLIER de Servière (N.), 1719 and 1733. App. 559.

Elementary. GREGORY (O.), 1840; HARNESS, 1853; MARTIN (R.) 1802; STRINGHAM (J.), 1892.

Elements of the Mathematical Sciences. KARSTEN (W. J. G.), 1780.

Evolution of, in connection with the extension of Civilisation. LAMPE (E.), 1893.

Exercises, Select. SIMPSON (T.), 1792.

Guide to Mathematics. WARD (JOHN), 1713 and 1731.

High School for Mathematics and Engineering. Prospectus, 1841. HIGH School.

History. BOSSUT and Viallet, 1803.

—— References for the History of Mathematical Sciences. DE MORGAN (A.), 1842. Add. 496.

Institutions, Mathematical, system of. MARTIN (B.), 1759–64. App. 567.

Journal de Mathématiques pures et appliquées (Liouville). PERIODICAL PUBLICATIONS, p. 17.

MATHEMATICS (General References)—*continued.*

Journal für die reine und angewandte Mathematik (Crelle). Periodical Publications, p. 17.

Mémoires. Académie des Sciences, 1732 1809.

Nature of Negative and Imaginary quantities. Gilbert (D.), 1831, p. 385.

Papers, Mathematical. Clifford (W. K.), 1882.

—— Mathematical and Physical Papers. Stokes (Sir G. G.), 1880–83.

Plain, Mathematics made. Neve, 1708.

Practical men, Mathematics for. Gregory (O.), 1825, '48.

Principles, Mathematical, applications of, to theories of the physical forces. Challis, 1869.

Pure Mathematics. Francœur, 1809.

—— Synopsis of elementary results in pure Mathematics. Carr (G. S.), 1886.

Quarterly Journal of pure and applied Mathematics. Periodical Publications, p. 22.

Quantities, Mathematical Classification of Physical. Maxwell, 1871.

Recreations, Mathematical. Ball (W. W. R.), 1892; Ozanam, 1803. Arithmetical and Geometrical problems. Ozanam (J.), 1750. App. 570.

Rectilinear Triangles. Properties. Jacobi, 1825.

Repository, Mathemathical, containing analytical solutions of near 500 questions. Dodson (J.), 1775. App. 554.

Researches, Mathematical. Anonymous, 1875, p. 46; Jerrard, 1832.

Rudiments of Mathematics. Ludlam (W.), 1809. App. 566.

Study of Mathematics part of a liberal education. Whewell (W.), 1835.

Theorems, Some general, of considerable use in the higher parts of Mathematics. Stewart (M.), 1746. App. 577.

Tracts, Mathematical. Robins (B.), 1761.

Tracts, Mathematical and Physical. Brougham, 1860.

Treatises (Old) on Mathematics. Halliwell (J. O.), 1839.

Usefulness of Mathematical Learning explained. Lectures. Barrow (J.), 1734. App. 547.

Working Men, Mathematics for. Tate (T.), 1856.

MATHEMATICS (Algebra).

Algebra. Euler, 1795; Todhunter (I.), 1866, p. 315.

Combinatorial Analysis, application to problems of Algebra. Nicholson (P.), 1818.

Elementary Algebra. Anonymous, 1797. App. 544; Colenso, 1849; Hind (J.), 1841; Lacroix (S. F.), 1820; Tarnier (E. A.), 1854; Wood (James), D.D., 1848.

MATHEMATICS (ALGEBRA)—*continued.*

Equations, Algebraic. Suggestion of a proof of the theorem that every Algebraic equation has a root.
AIRY (Sir G. B.), 1859–60, p. 23.

—— Theory of Algebraical Equations. HYMERS, 1840.

—— Resolution of Algebraic Equations of the fifth degree.
JERRARD, 1845.

Guide. ARMENGAUD, C. (1867).

New Elements of Algebra and Geometry.
BLAISE (P.), 1743. App. 548.

Numbers. Application to the theory of Algebra. POINSOT, 1818.

—— Algebraic expression of the number of partitions of which a given number is susceptible.
HERSCHEL (Sir J. F. W.), 1850.

Principles of Algebra. ANONYMOUS, 1848, p. 51.

Quantities, Algebra of impossible. COCKLE, 1848.

Quartic Equations, Final Formulas for the Algebraic solution of.
MERRIMAN, 1892.

Ratios, Algebra of, with a theory of exponents; propositions of the fifth book of Euclid deduced. BROWNING (H. B.), 1849.

Self-taught Algebra. HIGGS (W. P.), 1876.

Treatise on Algebra. SIMPSON (T.), 1767, 1782, 1804, p. 204.

Trigonometry, Algebra and. GRIFFIN (W. N.), 1871.

Triplets, Algebraic and their geometric interpretations.
GRAVES (Rev. C.), 1845.

MATHEMATICS (ANALYSIS).

Analytical and Arithmetical Essays. NICHOLSON (P.), 1821.

Combinatorial Analysis. A Problem in. SPOTTISWOODE (W.), 1852.

Geometric analysis and Algebraic analysis. LHUILIER, 1809.

Infinitesimal Analysis. EULER, 1796.

Lectures on Analysis at the École Polytechnique. NAVIER, 1856.

Spirit of Mathematical Analysis. OHM, 1843.

MATHEMATICS (ARC).

Lines that divide each semi-diurnal arc into six equal parts.
CADELL, 1816.

Minimum of the potential of the Arc.
HATON de la Goupillière (J. S. V.), 1893. Add. 506.

MATHEMATICS (ARITHMETIC).

Arithmetic. COCKER, 1758; LEUPOLD, 1727; SCHULZ VON STRASSNICKI, 1848; WINGATE (E.), 1650. App. 581.

Beeton's Ready Reckoner. BEETON, 1872.

Decimal Arithmetic. ARMENGAUD (C.), 1867.

MATHEMATICS (ARITHMETIC)—*continued.*

Decimal Arithmetic. Improvements in Arithmetic, with a vindication of the decimal principle.
YATES (J.), and Barrett, 1860.

Dual Arithmetic, Art of. BYRNE (O.), 1866, 1878.

Fractional Arithmetic. CLIFFORD (E.), 1842.

History and Elements of Arithmetic.
DE MORGAN (A.), 1846. Add. 496.

Manual. GALBRAITH and Haughton, 1855.

Marquoi's parallel scales, Arithmetic considerations on, and the protractor. CLIFFORD (E.), 1841.

Mental Arithmetic. HOPKINS (H.), 1852.

Philosophy of Arithmetic. LESLIE (Sir John), 1820.

Principles. HOTSON, 1840.

Technical Arithmetic and Mensuration. MERRIFIELD, 1872.

Universalis, Arithmetica. NEWTON (Sir I.), 1732, 1761.

MATHEMATICS. Axes of Equilibrium. SPOTTISWOODE (W.), 1857.

MATHEMATICS. Brinkley's Formulas for the general terms in the development of Lagrange's expression for the Summation of Series.
HERSCHEL (Sir J. F. W.), 1860.

MATHEMATICS. Calculating Machines. *See* CALCULATING MACHINES.

MATHEMATICS (CALCULUS).

Differential Calculus. COX (H.), 1851; GARNIER (J. G.), 1811.

—— Application to Geometry. PRICE (B.), 1848.

—— Treatise. TODHUNTER (I.), 1864, p. 316.

Differential and Integral Calculus. CONNELL, 1844; GREENHILL, (A. G.), 1891; LACROIX (S. F.), 1810–19; MILLAR (W. J.), 1885.

—— Calculus of Variations, and the. HALL (T. G.), 1846.

Infinitesimal Calculus. BÉLANGER, 1859; BOUSSINESQ, 1887–90; PRICE (B.), 1857–62.

—— Reflections on the metaphysics of the Infinitesimal Calculus.
CARNOT, 1860.

Integral Calculus. HYMERS, 1835; TODHUNTER (I.), 1862, p. 316.

Operations, Calculus of. Some general formulas.
SPOTTISWOODE (W.), 1861.

—— —— Index Symbol. SPOTTISWOODE (W.), 1866.

Symbols, Calculus of. SPOTTISWOODE (W.), 1862.

Variations, Calculus of. ABBATT, 1836; AIRY (Sir G. B.), 1831, p. 17.

—— History of its progress during the nineteenth century.
TODHUNTER (I.), 1861, p. 316.

MATHEMATICS (Circle).

Binomial Theorem, Rule for formulizing by the, all epicyclical curves with one moving circle. Drach, 1849.

Circumference of the Circle, Mode of approximating to the. Drach, 1863.

—— Geometrical demonstration of the ratio of the circle's circumference to the diameter. Harris (John), 1879.

Circle and Straight Line. Harris (John), 1879.

—— Rational approximation to the. Rankine (W. J. M.), 1865.

—— Division of the Circle. Brooks (F.), 1878.

Quadrature of the Circle. Anonymous, 1870, p. 53; Fauré (De), 1749. App. 556. Collignon, 1887; Romano (A.), 1870; Rossi, 1804. App. 574.

—— Application to the configuration of the great Pyramids of Gizeh. Agnew.

—— The Circle Squared. Harbord (1874).

—— The Circle secerned from the Square and its area gauged in terms of a triangle common to both. Houlston, 1862.

—— Connection between the Quadrature of the Circle and the Geometrical Trisection of the Angle. Mahon, 1832.

—— Exact Numerical Quadrature of the Circle. Steel (James), 1881.

MATHEMATICS. Co-efficients in any series. Determination of the numerical values of the. Lubbock (Sir J. W.), 1848.

MATHEMATICS. Commercium Epistolicum. Authorship of the account of. De Morgan (A.), 1852. Add. 496.

MATHEMATICS (Conic Sections).

Conic Sections (Apollonius Pergæus). Barrow, 1675; Hamilton (H. P.), 1843; Lahire, 1723; Salmon (G.), 1850; Simpson (R.), 1775; Vince (S.), 1800.

Conic Sections and the Application of Algebra to Geometry. Hymers, 1837.

MATHEMATICS. Cubic Transformation by Casey. Cunningham Memoirs, vol. 1. Royal Irish Academy, 1880–88, p. 141.

MATHEMATICS (Curves).

Application of a new analytic method to the theory of Curves and Curved Surfaces. Booth (Rev. J.), 1843.

Contact of Curves. Spottiswoode (W.), 1862.

Curvature of Curves in Space. Spottiswoode (W.), 1854.

Curve Tracing, Elementary Treatise. Frost, 1872.

Curves produced by the Vibration of Straight wires. Sang (E.). 1889.

Curves of double curvature. Spottiswoode (W.), 1851.

Enumeration of Lines of the third order, generation of curves by Shadows, organic description of curves. Newton (Sir I.), 1856. Add. 523.

MATHEMATICS (Curves)—*continued.*

Epicyclical Curves. Rule for formularising by the Binomial Theorem all, with one moving circle.
Drach (S. M.), 1849. App. 555.

Equations of Rotation of a solid body about a fixed point.
Spottiswoode (W.), 1863.

Experimental Curves. Mechanical aid to the investigation of.
Young (J. D.), 1891.

Instructions for laying out circular, with spiral approaches.
Bouscaren.

Sextactic Points of a Plane Curve. Spottiswoode (W.), 1865.

Theory of Rolling Curves. Maxwell (J. C.), 1849.

Cross curves of stability. Denny, 1884.

Curved lines. Caracciolus, 1740.

Oval Curves. Description. Maxwell (J. C.), 1860, p. 335.

Septenary System of generating Curves by continued motion.
Jopling, 1823.

MATHEMATICS. Determinants, Elementary Theorems relating to.
Spottiswoode (W.), 1855.

MATHEMATICS (Dictionaries).

Applied Mathematics. Dictionary. Sonnet (H.), 1867.

Mathematical Dictionaries. Barlow (P.), 1814; Hutton (C.), 1815; Moxon (J.), 1692. App. 569.

MATHEMATICS. Differential Resolvents.
Spottiswoode (W.), 1864.

MATHEMATICS (Ellipse).

Attraction of Ellipsoids. Lubbock (Sir J. W.), 1830.

Ellipses. Perigal (H.), 1855

Perfect Ellipse. Harbord (1874).

Rectification and quadrature of the spherical ellipse.
Booth (Rev. J.), 1844.

MATHEMATICS (Equations). Favaro, 1878–80.

Cubic and Biquadratic Equations. Method of Solution.
Pratt (O.), 1866.

Determinate equations, Analysis of. Fourier, 1831.

Differential Equations. Boole, 1865.

—— and Calculus of finite differences. Hymers, 1839.

—— Doctrine of Germs. Earnshaw, 1881

—— Petzval's asymptotic method of solving.
Spottiswoode (W.), 1861

—— Integration of differential equations. Biot, 1860; Franchini, 1799.

MATHEMATICS (EQUATIONS)—*continued.*

Machine for resolving by inspection certain important forms of Transcendental Equations. HERSCHEL (Sir J. F. W.), 1832.

Method of solving equations of all degrees. BYRNE (O.), 1868.

Methods used for approximating to the Roots of Affected Equations. GILBERT (D.), 1823.

Numerical Equations, Analysis of. YOUNG (J. R.), 1850.

—— New method of resolving. BUDAN de Boislaurent, 1822.

—— Resolution of numerical equations. LAGRANGE, 1826; STURM (C.), 1835.

—— Observations on Lagrange's "Équations Numériques." NEGRI, 1820.

Theory of Equations, Elementary Treatise. TODHUNTER (I.), 1867, p. 315.

MATHEMATICS. Errors of Observations, Algebraical and Numerical Theory of. AIRY (Sir G. B.), 1879, p. 19.

MATHEMATICS (FLUXIONS).

Fluxions, their doctrine and application. SIMPSON (T.), 1776 and 1805, p. 203.

Method of Fluxions and Infinite Series. NEWTON (Sir I.), 1736.

Principles of Fluxions. VINCE (S.), 1812.

Treatise of Fluxions. LYONS (J.), 1758.

MATHEMATICS (FRACTIONS). Vulgar Fractions, Systematic interruption in the order of numerical values of. AIRY, Sir G. B. (1881), p. 18.

MATHEMATICS (FUNCTIONS).

Analytical Functions, Theory. LAGRANGE, 1799, 1813.

Determination of the functions Y and Z which satisfy the equation $4(x^n - 1) = (x - 1)(Y^2 \pm n Z^2) n$. LEGENDRE, 1830.

Elliptic Functions, Applications of. GREENHILL (A. G.), 1892.

—— and Eulerien Integrals. LEGENDRE, 1828.

Essay on Involution and Evolution. Method of ascertaining the numerical value of any function of an unknown quantity. NICHOLSON (P.), 1820.

MATHEMATICS (GEOMETRY). ARMENGAUD (C.), 1867; BAILLAIRGÉ, 1886, 1873; DESCARTES, 1683; ECHEGARAY, 1867; EUCLID, 1720, 1845; LEUPOLD, 1727; SCHULZ VON STRASSNICKI, 1850.

Analysis, Geometrical, and Plane Trigonometry. LESLIE (Sir John), 1809, '17, '21.

Analytical Geometry. BÉLANGER, 1859; FEDOROW, 1888.

—— of three dimensions. HYMERS, 1836, '48; TODHUNTER (I.), 1864, p. 315.

Application of Analysis to Geometry. MONGE, 1809.

Application to mensuration of Superficies and Solids. SIMPSON (T.), 1800, p. 203.

MATHEMATICS (GEOMETRY)—*continued.*

Applications. DUPIN, 1813, '22.
Applications to the Arts. LARDNER, 1840.
Applied Geometry Instruments and modern methods. SALMOIRAGHI (A.), 1884.
Approximations, Geometrical. PRESSLAND, 1892.
Architect, Engineer, etc., Geometry for the. TARN (E. W.), 1871.
Areas of Circles and Squares. BATTYE, 1869.
Association for the improvement of Geometrical Teaching. ASSOCIATION, 1878.
Constructive Geometry of Plane Curves. EAGLES, 1885.
Co-ordinate (Plane) Geometry as applied to the straight line and conic Sections, Treatise on. TODHUNTER (I.), 1867, p. 316.
Co-ordinates, parallel and axial. OCAGNE, 1885.
Correspondence (Geometrical), between Mr. Donkin and Mr. Spottiswoode. SPOTTISWOODE (W.), 1853.
Curve Lines, Geometry of. LESLIE (Sir John), 1813, '21.
Demonstration of the principal theorems. ANONYMOUS, 1798, p. 52.
Descriptive Geometry. LA GOURNERIE, 1855; OLIVIER (T.), 1843–47; VALLÉE (L. L.), 1819; TRESCA (H.) and Olivier, 1852.
Difficulties in the elements of. BEDDOES, 1793.
Duplicate Proportion. PETTY, 1864.
Elements of Geometry. LEGENDRE, 1846.
Euclid. Appendix to the elements of Euclid, doctrine of solids. COWLEY, 1761.
—— Appendixes to Euclid's Elements. POTTS (R.), 1841, 1847.
—— Doctrine of Proportion developed, or the fifth book of Euclid simplified. BYRNE (O.), 1841.
—— Elements of Euclid. EUCLID, 1714, 1781–88. App. 556.
—— Euclid corrected. MULLER (John), 1773. App. 570.
—— Properties of a right-angled triangle; 47th proposition of first book of Euclid's Elements. BRANSBY.
—— Twelfth axiom of the first book of Euclid. MAHON, 1830.
Fortification, geometry applied to the study of. ANONYMOUS, 1885, p. 43.
Infinite, Geometry of the. ACADÉMIE des Sciences (1729).
Introduction to Geometry as taught in the Lancastrian Schools of France. FRANCŒUR, 1835.
Japanese theory of parallels. CLAUDEL, 1875.
Linear Plane and Solid Geometry, Rudiments. LARKIN (N. J.), 1820.
Masses, Geometry of. HATON de la Goupillière (J. N.), 1893. Add. 506.
Plane Geometry. On the mode of using the signs + and − in. DE MORGAN (A.), 1851. Add. 496.

MATHEMATICS (GEOMETRY)—*continued.*

Plane Geometry. Rudiments of Plane Geometry.
LESLIE (Sir John), 1828.

—— Plane and Solid Geometry, Elements of.
WATSON (H. W.), 1871.

Practical Geometry. BURN (R. S.), 1853; CLARKE (G. S.), 1884; LODI, 1854. Including Conic Sections and Plan Drawing.
PASLEY, 1822.

Problems of Geometry. COLLIGNON (E.), 1885–6.

Reciprocal Figures. MAXWELL (J. C.), 1864, '70.

Solid Geometry. FROST, 1886; LARKIN (N. J.), 1820.

—— Illustration and mensuration of. COWLEY and Jones, 1787.

Substitution of methods founded on ordinary geometry for methods based on the general doctrine of proportions in the treatment of some geometrical problems.
AIRY (Sir G. B.), 1858, p. 21.

Theorems, Geometrical. SPOTTISWOODE (W.), 1851.

MATHEMATICS (INTEGRALS).

Treatise on Definite Integrals. MOSELEY, 1837.

—— Evaluation of a definite Integral. Logarithmic Integrals of the Second Order. NEWMAN (F. W.), 1847.

Method of expressing when possible the value of one variable quantity in Integral power of another. BRINKLEY, 1800.

MATHEMATICS (LIMITS).

Doctrine of Limits, with its applications. WHEWELL (W.), 1838.

MATHEMATICS (LINES).

Method to determine the areas of right lined figures universally.
BURGH (T.), 1724.

New class of properties of Lines and surfaces of the second order.
BOOTH (Rev. J.), 1843.

MATHEMATICS (MAXIMA and MINIMA).

Geometrical and Algebraical investigation of. CRESSWELL, 1817.

Problems of Maxima and Minima solved by algebra.
RAMCHUNDRA.

MATHEMATICS. Meditationes analyticæ.
SPOTTISWOODE (W.), 1847.

MATHEMATICS (NUMBERS).

History of Numbers. REGNIER, 1855.

Partition of Numbers and on Combinations and Permutations.
WARBURTON (H.), 1847; NEWTON.

Theory of Numbers. LEGENDRE, 1808, '30; POINSOT, 1818.

MATHEMATICS (PARALLELS).

Different modes of demonstrating the theory of parallels.
LEGENDRE, 1883.

MATHEMATICS. Polar Reciprocation, method of, as applied to theorems of quantity. MARTIN (T.), 1860.

MATHEMATICS (PROBABILITIES).

Calculation. QUETELET, 1839.

Calculus of Probabilities. LACROIX, 1816, '33; LAPLACE, 1820, 1829.

Calculus of Probability and theory of errors. LIAGRE, 1852.

History of the Mathematical Theory of Probability. TODHUNTER (I.), 1865, p. 315.

Rule of Probability. HAGEN (G.), 1867.

Theory. LAPLACE, 1814, 1816, 1820; QUETELET, 1849.

MATHEMATICS. QUATERNIONS, treatise. TAIT (P. G.), 1867.

MATHEMATICS. SERIES, diverging Infinite. YOUNG (J. R.), 1845.

Investigation of the general term of an important Series in the inverse method of finite differences. BRINKLEY, 1807.

Interpolation and adjustment of Series. DE FOREST, 1876.

Numeric series and their application to Geometry. COLLIGNON, 1888.

Self-repeating Series. WARBURTON (H.), 1854.

MATHEMATICS. SIGNS, influence of in mathematical reasoning. BABBAGE (C.), 1826.

MATHEMATICS (SQUARES).

List of Writings relating to the Method of least Squares. MERRIMAN, 1877.

MATHEMATICS (SURFACES).

Properties of Surfaces of the Second Degree analogous to the theorems of Pascal and of Brianchon. CHASLES (M.), 1839.

On the Hyperboloid, the Paraboloid and the Cone of the Second Degree. CHASLES (M.), 1840.

Surfaces of the Second Order. MACCULLAGH, 1850.

MATHEMATICS. Syzygies of the Binary Sextic and their relations. HAMMOND (J.), 1885.

MATHEMATICS (TABLES).

Table of Logarithmic Sines and Cosines. CONNOR, 1880.

Table of products, quotients, squares and roots. CONNOR, 1881.

MATHEMATICS (TABLES)—*continued.*

Tables, mathematical. BARLOW (P.), 1814, 1840; BELL (A.), 1844; CHAMBERS (W. and R.), 1883; HUTTON (C.), 1811.

Theorems of Taylor and Maclaurin in a finite form. NEWMAN (F. W.), 1830.

MATHEMATICS (TRIGONOMETRY).

Trigonometry. AIRY, Sir G. B., 1850, p. 23; BAILLAIRGÉ, 1866.

Plane Trigonometry. GALBRAITH and Haughton, 1855; MASERES, 1760; NESBIT, 1847.

Treatise on Plane and Spherical Trigonometry. HALL (T. G.), 1848; HYMERS, 1847; TODHUNTER (I.), 1864 and 1863, p. 316.

Trigonometry for beginners. TODHUNTER (I.), 1873, p. 316.

MATHEMATICS (TRINOMIAL).

Factorial resolution of the Trinomial. AIRY (Sir G. B.), 1869, p. 20.

MATHEMATICS. (Trisection of the Angle). Approximate method. COLLIGNON, 1887.

MEASURES, WEIGHTS AND MONEY (GENERAL REFERENCES).

Balance of a new construction supposed to be of use in the woollen manufacture. LUDLAM (W.), 1766. App. 566.

Balances. CHISHOLM, 1879.

Calculations of Densities and Expansions, 1883. PARLIAMENTARY . . . Papers, p. 521.

Coinage. Alloys used for Coinage. ROBERTS-AUSTEN (W. C.), 1884, p. 119.

—— England, Silver and Gold Coinage from the Conquest. NORMAN (J. H.), 1890.

—— Coin of the realm, talks about gold and silver coins, with lessons based on "Norman's single grain system." SHARLAND (E. C.), 1888.

—— Treatise on Coining. ANSELL, G. F., 1862.

—— United States, coinage, weights, measures etc. UNITED STATES, p. 343.

—— Coins of the World. ANONYMOUS, 1845, p. 57.

—— Gold and Silver Conversion Tables giving the coinage value of troy ounces of fine metal, etc. WILLIAMS (A.), Junior, 1883.

Difference between Square and Superficial measurement. PETERS (W.), 1865.

Expediency and practicability of simplifying and improving. PASLEY, 1834.

French Measures and English equivalents. BROOK, 1873.

MEASURES, WEIGHTS AND MONEY (General References)—*continued.*

French System of Measures, Weights and Coins and its adaptation to general use. Yates (J.), 1854.

Grecian, Roman and Jewish Measures, weights and coins reduced to the English Standard. Tables of.
Arbuthnott (J.), 1700. App. 545.

Law of Weight. Laplace, 1821.

Measures of Capacity, construction and use of a scale for gauging Cylindrical. Airy (Sir G. B.), p. 19.

Measuring and valuing artificers' works. Dobson, 1843, 1844.

Metrology (English). Burgue, 1874.

—— Metrology, or Weights and Measures of Great Britain and France. Kelly (Dr. P.), 1816.

—— Universal Metrology. Palaiseau, 1816.

Money and Civilization. Monetary Laws and Systems of various States. Del Mar (A.), 1886. Add. 496.

—— Money System of England from the Conquest.
Taylor (James), 1828.

—— English and French Money and Measurement compared and equalised. Temple (J. A.), 1861.

—— Silver and Gold. Money of the world.
Molesworth, 1891.

New legal system. Martin (M.), 1853, '61.

Pantometry: or an attempt to systematize every branch of Admeasurement. Dawes (J.), 1797. App. 553.

Physical Measurements, Cornell University.
Hitchcock (E.), jun., 1890.

—— Introduction to Physical Measurements.
Kohlrausch, 1883.

Re-determination of the mass of a cubic inch of distilled water.
Chaney, 1892.

Re-determination of the true weight of a cubic inch of distilled water. Chaney, 1890.

Simplified weights. Jackson (L. d'A.), 1876.

Standard Measures. Whitworth (Sir J.), 1882.

Standards. Account of the comparison of various British Standards of linear measure.
Kater (Capt. H.), 1821. App. 564.

—— Construction and Adjustment of the New Standards of Weights and Measures of the United Kingdom.
Kater, 1826

—— Comparison of various British Standards of Linear Measure.
Kater, 1821.

—— Report on the work of constructing standards.
Bache, 1845.

MEASURES, WEIGHTS AND MONEY (General References)—*continued.*

Standards. Comparison of the Standards of Length of England, France, Belgium, Prussia, Russia, India, Australia.
James (Sir H.), 1866.

—— Comparison lately made between the Standard of a Yard and several weights made for the Royal Society and the original Standards and measures, etc., in the Exchequer, Guildhall, etc.
Royal Society, 1743. App. 575.

—— Construction and verification of a standard measure of 100 feet, 1876. Parliamentary..Papers, p. 520.

—— Descriptive list of Standards of Weight and Measure deposited with the Board of Trade, 1892.
Parliamentary..Papers, p. 521.

—— Memoranda concerning the cubic contents, linear dimensions, etc., of the Standard Bushel Measure, 1879.
Parliamentary..Papers, p. 251.

—— Endeavours to ascertain the Standard, Statutes, experiments, 1758–59. Parliamentary..Papers, p. 520.

—— Reports of Warden of the Standards, 1867–79.
Parliamentary..Papers, p. 520.

—— Reports of Commissioners appointed to inquire into the condition of the Standards, 1868–71.
Parliamentary..Papers, p. 520.

—— Comparisons of the three Parliamentary copies of the Imperial Standards, 1877. Parliamentary..Papers, p. 520.

—— Yard, the pendulum and the meter.
Herschel (Sir J. F. W.), 1863, p. 49.

—— India. Verification of Standard Weights, 1893.
India, p. 109.

—— Russia. Linear Measures for the Russian Government. Construction and verification of certain standards of.
Kater (Capt. H.), 1832. App. 564.

—— United States. Fundamental Standards of Length and Mass. United States, 1893. Add. 537.

Time. Attempts to obtain invariable measures of Length, Capacity and Weight from the Mensuration of Time.
Whitehurst (J.), 1787. App. 580.

Tonal system. New system to be called. Nystrom, 1862.

Trade. Gold and Silver: Memo. on the existing relations between them as affecting British. Tidman (P. F.), 1886.

Unit of Length. What is the best. Yates (J.), 1858.

Units. Centimetre-gramme-second system of.
Everett (J. D.), 1865.

—— Units and Physical Constants. Everett (J. D.), 1879.

Weighing Machine. Description, 1886; mode of testing, 1886.
Parliamentary..Papers, p. 54.

MEASURES, WEIGHTS AND MONEY (GENERAL REFERENCES)—*continued.*

Weights and Measures. AIRY (Sir G. B.), 1862, p. 18.
—— Computation of the difference between the old and new weights and measures. HAVILAND (J.), 1846.
—— Dictionary of Weights and Measures, ancient and modern, reduced to standards of the United States. ALEXANDER (J. H.), 1850.
—— Ancient and Modern Weights and Measures Dictionary. DOURSTHER, 1840.
—— System of International Measure and Weight. HANSSEN (C. J.), 1891.
—— Comité International des Poids et Mesures. COMITÉ, 1881, etc.
—— Manufacture and verification of Weights and Measures. CUNIN-GRIDAINE, 1839.
—— Weights, Measures, and Money of all Nations. CLARKE (F. W.), 1876; WOOLHOUSE (W. S. B.), 1869, '72.
—— Reports. ADAMS (J. Q.), 1821; FRANKLIN Institute, 1834.
—— Science of Weighing and Measuring. CHISHOLM, 1877.
—— Uniformity of Weights and Measures. BRITISH Association, 1886.
—— Weight Calculator. HARBEN, 1876.

Argentine Republic. ARGENTINE.
Boston, Mass. Report of Committee. BOSTON Society of Civil Engineers, 1888.
English System of Weights and Measures. ALEXANDER, J. H., 1857.
—— Report of Select Committee on the Weights and Measures Bill, 1855. PARLIAMENTARY..Papers, p. 520
—— Index to Reports, 1814–1834. PARLIAMENTARY..Papers, p. 520.
—— Reports of Select Committees, 1821, 1862. PARLIAMENTARY..Papers, p. 520.
—— Bill for ascertaining and establishing uniformity, 1822. PARLIAMENTARY..Papers, p. 520.
—— Report by the Board of Trade on proceedings under the Weights and Measures Act, 1878. PARLIAMENTARY..Papers, p. 521.
India. Act to regulate, 1871. INDIA, p. 109.
—— Madras. Memorandums on Land Measures and Weights and Measures, 1833. INDIA, p. 125.
Ohio. Auxiliary Society of International Institute for perfecting Weights and Measures. Proceedings, 1881–82. OHIO.
Scotland. Glasgow and other towns in Scotland. CLELAND, 1822.
—— Report of the City of Glasgow. GLASGOW, 1824.
United Kingdom, Weights and Measures of, amendments needful. CLARK (Dr. T.), 1883.

MEASURES, WEIGHTS AND MONEY (Decimal Coinage).

Coinage. Anonymous, 1854, p. 43; Anonymous, 1855, p. 43; Aslit, 1854; Brown (W.), 1854; Ryley (E.), 1853.

—— Decimal Accounts and Coinage. Rathbone (T. W.), 1854.

—— Ceylon Report, 1869. India, p. 115.

—— Decimal sub-division of the Rupee, 1869. India, p. 115.

—— Issue of a five-farthing piece. Milward, 1853.

—— International coinage for Great Britain and the United States. Alexander (J. H.), 1857.

—— Penny considered as the foundation of a Decimal Currency. Turner (J. H.), 1855.

—— Examination of the report of the Committee of the House of Commons. Rathbone (T. W.), 1854.

Decimal Coinage, should it be international? Meekins, 1856.

—— Answers to Questions of Lord Overstone to Decimal Coinage Commissioners. Herschel (Sir J. F. W.), 1857.

—— Problem solved. Haskins (Rev. E. H.), 1858.

—— Proposed Decimal Coinage. Clayton (J.), 1856.

—— Report of Select Committee, 1853. Parliamentary . . . Papers, p. 474.

—— 1854, '55, Appendix to evidence before Royal Commission. Minasi, 1857.

—— Simplification of International Moneys. Decimal Association, 1854, 1890.

Decimal Currency for the United Kingdom. Comparative merits of one pound and tenpence as the ruling integer. Laurie, 1854.

Decimal Tables used at the Bank of England for reducing the gross weight of gold and silver to standard. Miller (W.), 1854.

MEASURES, WEIGHTS AND MONEY (Decimal System). Jones (W. A.), 1852.

Decimal Arithmetic. Armengaud, 1867.

Decimal calculator or figures simplified. Mears, 1854.

Decimal Calculus, etc. Tarbé des Sablons (S. A.), 1845.

Decimal system for England and her colonies. Rohde (R. T.), 1884 and 1888.

Decimal system as applied to coinage, weights and measures of Great Britain. Taylor (H.), 1851.

Decimalism. Anonymous, 1855, p. 43.

Decimalization of the weights, measures and moneys of the United Kingdom. Slater (R.), 1855.

International Association for obtaining a uniform decimal system of Measures, etc. Yates (J.), and Barrett, 1860.

—— Decimal system of measures, weights and coins. Origin and formation of the International Association for obtaining a uniform. Yates (J.), 1856

MEASURES, WEIGHTS AND MONEY (Decimal System)—*contd.*

Measures, Coins. Decimal. Dowson, 1891.

Mensuration made easy. Decimal system for the million. Hoare, 1855.

Money and Measures, Decimal System of. Jessop (W. H. R.), 1856.

—— Decimal Weights and Measures. Airy (Sir G. B.), 1867, p. 16.

—— United States extension of the decimal scale to Weights and Measures in harmony with the National Currency. Felton (J. H.), 1857.

—— Decimal Coinage, Weights and Measures popularly explained. Molesworth and Dowson, 1890.

MEASURES, WEIGHTS AND MONEY (Metric System).

Bergen, 1870; International Association for Decimal System, 1859, etc.; Kerr (Rev. J.), 1863; Nördling, 1848, '58, '60; Sellers (C.), 1880.

Base of the metrical decimal system (Measure of the Arc of the Meridian). Méchain and Delambre, 1806–21.

Bill, Metric Weights and Measures. Hope (A. J. B. B.), 1868.

—— Bill to establish the Metric System, 1864. Parliamentary..Papers, p. 520.

British Metric Weights and Measures. Scales for comparison of. Newdigate, 1886.

—— Metric and British and United States Weights and Measures, Conversion tables. Thurston (R. H.), 1883.

Comparative size of metric and old units. Brooks (F.), 1886.

Decimalising. Proposal for Weights and Measures. Aslit, 1854.

Dictionary of Metric and other useful Measures. Clark (L.), 1891.

Egyptians, Metric system of the antient. Jomard, 1817.

Equivalents of Metric and Imperial Weights and Measures. Parliamentary..Papers, 1878, p. 520; Chaney, 1882.

French Metre. Length of, estimated in parts of the English Standard. Kater (Capt. H.), 1832. App. 564.

—— Cost of Metres in French money reduced to Yards in English Money. Temple (J. A.), 187–.

Impediments to the introduction of the metrical system. Fellows, 1863.

India. Metric System in British India. Aitken (R.), 1867.

Paddington. Introduction of the average meter system in. Miller (Horatio), 1825.

Report on the Metric System. Philadelphia [1878], p. 33.

Tables of Metric Measures and their English equivalents. Borns, 1879.

United States, Adoption of the metric system in the. Civil Engineers' Club, N.W., 1878.

MEASURES, WEIGHTS AND MONEY (METRIC SYSTEM)—*contd.*

Units (Metrical) and Systems. JACKSON (L. d'A.), 1882

Weights and Measures. Metric System of. LEVI, 1862; PORTER (J. S.), 1859.

Why we do not adopt the metrical system. GILES, 1886.

MECHANICS. BÉLANGER, 1857; COLLIGNON (E.), 1873–74; EULER, 1736; FERGUSON (J.), 1799; GERSTNER, 1831–4; HARNESS (vol. 3), 1853; HERBART, 1822; HERTZ, 1894. Add. 507; NICHOLSON (P.), 1812; POISSON (French, 1811, 1833; English, 1842); REDTENBACHER, 1859; RITTER (A.), 1883, '84; WEBER (Wilhelm), 1892–94; WERNICKE, 1873.

Analytical Mechanics. LAGRANGE, 1811–15. Solids and Fluids. WOOD (De V.), 1884.

Apparatus illustrating Mechanical Principles. THURSTON (R. H.), 1871, p. 308.

Application of, to water engines, steam engines, wind engines, &c. TAFFE, 1839.

Applied Mechanics. ALEXANDER, T., and Thomson, 1880; BORGNIS, 1818, '21; BORGNIS, App. 549; BOVEY, 1882–83; BRESSE, 1859–65, 1865–80; COTTERILL, 1884, 1892; CUNNINGHAM (A.), 1876; DUPIN, 1821, '22; DWELSHAUVERS-DERY, 1866, 1876, 1887; ELLIOTT (John), 1871; LANZA, 1890; MARVA Y MAYER, 1894. Add. 518; RANKINE (W. J. M.), 1851, 1888.

—— Appleton's Cyclopædia. BENJAMIN, 1880–81.

—— Lectures on the elements. CROFTON, 1886.

—— International Congress, Paris, 1889. INTERNATIONAL Congress on A. M.

—— Laboratory of Applied Mechanics of the technical faculty of the University of Liége. Report, 1893–4. DWELSHAUVERS-DERY (V. A. E.), 1894. Add. 498.

—— Applied to Construction. COLLIGNON (E.), 1867–70.

Application of science to the mechanical arts. BARR (A.), 1889.

Centrifugal action in practical work. LAIDLAW (J.), 1891.

Circle of the Mechanical Arts. MARTIN (T.), 1820.

Cole's Mechanic and Hydraulic Models. Exhibition of, Catalogue, etc. COLE (W.), 1797. App. 552.

Coloured designs for teaching. MORIN, 1856.

Companion, Mechanic's, and the scientific gentleman's practical assistant. TEMPLETON (W.), 1845, 1847, 1886.

Compendium. BRUNTON (R.), 1824.

Condensed Mechanics. HUGHES (W. G. C.), 1891.

Construction, Mechanics of. FENWICK (S.), 1861.

Course. BRISSE, 1892.

MECHANICS—*continued.*

Curious works on mechanics. Collection of.
GROLLIER de Servière, 1719, '33. App. 559.

Determination and graphic delineation of the moment of inertia of plane surfaces. MOHR (O.), [1887.]

Dictionary of Mechanics. APPLETON D., (1857); KNIGHT (E. H.), 1877–84.

Discoveries. Retrospect of Mechanical, etc.
PERIODICAL PUBLICATIONS, p. 23.

École Polytechnique. NAVIER, 1841.

—— Course of mechanics and machinery taught at the Paris École Polytechnique. BOUR (E.), 1868. App. 549.

École des Ponts et Chaussées. Application to machines.
NAVIER, 1833.

Elements. BOUCHARLAT, 1827; FRANCŒUR, 1804, 1825; GOODEVE, 1860, 1871; NYSTROM, 1875; RÉSAL (H.), 1851.

Elements of mechanism.
BAKER (T.), 1852, 1867; TATE (T.), 1851.

English and American Mechanic. VAN CLEAVE (B. F.), 1890.

Euclid, Mechanical. WHEWELL (W.), 1843, '49.

Examination. Mechanics as required for the Matriculation of the University of London. AVELING (E.), 1888.

Experimental Mechanics. BALL (Sir R. S.), 1871.

Fluids, Mechanics of. JAMIESON (A.), 1837.

Fundamental ideas of mechanics and experimental data.
MORIN, 1860.

Glasgow Mechanics' Magazine. PERIODICAL PUBLICATIONS, p. 16.

Guide, Mechanic's. A treatise on the laws of mechanics as they relate to wheel machines. BIGLAND (W.), 1797; BIGLAND (W.), 1797. App. 548.

Handbook. LARDNER, 1877.

Industrial mechanics. CHRISTIAN, 1822–52.

—— Experimental mechanics. PONCELET, 1841, 1844.

Institution, Mechanics', Bristol Report, 1839. BRISTOL, 1840.

Laboratories. DWELSHAUVERS-DERY, 1891.

Laws of Mechanics. BIGLAND, 1797.

Lecture on Mechanics. SELLERS (C.), 1884.

Manual. GALBRAITH and Haughton, 1855.

Mathematical Principles of Mechanical Philosophy.
PRATT (J. H.), 1836.

Mechanical Graphics. HALLIDAY, 1889.

Mechanical movements, five hundred and seven.
BROWN (H. T.), 1888.

Mechanical movements. Models and machine parts in the Polytechnic School, Carlsruhe. REDTENBACHER (F.), 1857.

MECHANICS—*continued.*

Mechanical Philosophy. Brewster, 1822; Robison (J.), 1822; Tate (T.), 1853.
—— System of Apparatus for use in. Willis (R.), 1851.
Mechanical powers—Wedges. Bonolis (A.), 1872.
Mechanical Technics. Hartig, 1883.
Mechanics and machines. Bour, 1868; Bresse, 1885.
Mechanics and Mechanism. Burn (R. S.), 1854.
Mechanics and Natural Philosophy Exercises. Tate (T.), 1847.
Mechanics for the Millwright, Machinist, Engineer, Architect, etc. Overman, 1867.
Mechanics of Fixed Bodies. Eytelwein, 1808.
Mechanics of Materials. Text Book. Merriman, 1885, '86.
Mechanics of Solid Bodies. Coriolis, 1844.
Modern Mechanism. Latest progress in machines, motors, and the transmission of power. Benjamin, 1892.
Pocket book. Kreuter and Otto, 1882; Nystrom, 1870.
Power. Treatise of the Mechanical Powers. Imison, 1787.
—— Mechanical Powers. Mandey and Moxon, 1696; Motte (A.), 1733. App. 569.
Practical Mechanics. Armengaud (C.), 1867; Fenwick (T.), 1822; Perry (Prof. J.), 1883, p. 29; and Machine Design elements, Blaine (R. G.), 1893; numerical examples, Blaine (R. G.), 1888; essential elements, Byrne (O.), 1867.
Practical Mechanics for officers of Artillery and Civil and Military Engineers. Morin, 1837, '43, '47.
Principles. Emerson (W.), 1793, 1800; Fraser (T.), 1863; Goodeve, 1881; Graeff, 1882–83; Millar (W. J.), 1874; Willis (R.), 1841.
Problems of Mechanics. Collignon (E.), 1887, '90.
Rudimentary Mechanics. Tomlinson (C.), 1878.
Science, Mechanical. Armstrong, 1881.
—— Development of graphic methods in. Hele-Shaw, 1892.
Science of Mechanics applied to the Fine Arts. Simonds (G.), 1884.
Scots Mechanics' Magazine. Periodical Publications, p. 24.
Solid Bodies. Devillez, 1873.
Specific names for functions of simple elements. Gilbert (D.), 1827.
Stevens Institute. Letter on the organization of a Mechanical Laboratory as an adjunct to the Dept. of Mechanical Engineering. Thurston (R. H.), 1874, p. 309.
Structural Mechanics. Parkinson (R. M.), 1890.
Study of Mechanics. Introduction to. Rankine (W. J. M.), 1873.
Subjects, Mechanical. Miscellaneous papers on. Whitworth (Sir J.), 1858.

MECHANICS—*continued.*

System. PARKINSON (Rev. T.), 1789.
Tables, Mechanical. FODEN, 1886.
Teaching of Mechanics. DWELSHAUVERS-DERY and Weiler, 1893.
Technical Mechanics. RITTER (A.), 1884.
Technology, Mechanical. HOYER, 1878.
Theoretical Mechanics. WEISBACH (J.), 1855–63, 1877–83.
Theoretical and applied. DELAUNAY, 1852.
Theoretical and practical. HANN, 1848; MARRAT, 1810.
Theory of mechanics as applied to works of construction. MARSHALL (J. G. B.), 1851.
—— Harmony of Theory and Practice. RANKINE (W. J. M.), 1856.
Tracts, Mechanical. WHITEHURST (J.), 1812. App. 580.
Treatise of the Mechanical Powers. MOTTE, 1733.
Treatises on Mechanics. ARNAL, 1892; GREGORY (O.), 1815, '26; JANET, 1893; KATER and Lardner, 1830; MOSELEY, 1847. Illustrations. MOSELEY, 1848; RÉSAL (H.), 1873–81; WHEWELL (W.), 1824, '33, '36.
Uniplanar Kinematics. Class Room notes. STRINGHAM (J.), 1893. Add. 535.
Whitworth's Scholarships for Mechanical Science. Prospectus. SCIENCE and Art Dept., 1870, '86.
Workshop Mechanic. ORTOLAN, 1878.
See also DYNAMICS, STATICS.

MEDALS.

Architectural medals of classic antiquity. DONALDSON (T. L.), 1859.
Arctic Explorers. Kane, Hayes, Hall. Reports of Foreign Societies. KANE (E. K.), 1876.
Royal Society Medals. Report on their adjudication. ROYAL Society, 1831.

MEDICINE. CHASPIGNON, 1848.
Harveian Oration. ASH, 1790.
Madras Medical Department. Report, 1859–60. INDIA, p. 123.
Medical Education and Registration, General Council Dentists' Register, Medical Register, 1887. GENERAL Council.
Pharmaceutical Journal. PERIODICAL PUBLICATIONS, p. 21.
Pocket Doctor for the Traveller and Colonist. LEACH (H.), 1875.

MEMOIRS. *See* BIOGRAPHY.

MENSURATION. BAILLAIRGÉ, 1873, 1875; HARNESS (vol. 1), 1853; HUTTON (C.), 1770; MOORE (B. T.), 1863.
Useful rules and tables. RANKINE (W. J. M.), 1866, 1873, 1883.

MERCANTILE MARINE (British).
Duties of Officers and Seamen. Allingham, 1892.
Education. Allingham, 1893.
Opportunities of advancing Science. Collingwood, 1862.
Protection of Mercantile Marine during War. Beresford (Lord C.), 1893.
See also Ships and Steam Vessels.

MERCURY.
California, Mercury mines of. Rolland (G.), 1878.
Condensation at New Almaden, California. Christy (S. B.), 1885.
Conductibility of Mercury and Amalgams. Crace Calvert, 1859.
Metallurgical treatment in Spain. Escosura y Morragh, 1878.
Metallurgy of Mercury in the United States. Egleston, 1887, '90.
Quicksilver deposits of the Pacific Slope. Becker (G. F.), 1888.
Temperature of the melting point. Stewart (Balfour), 1862.

MERIDIAN.
Meridian of the Observatory of Paris. Académie des Sciences, 1744.
Voyage to the Equator to measure the three first degrees of the Meridian, 1751. Académie des Sciences.

MESMERISM. Mesmerism and Massage, Instruction in. Younger (D.), 1890.

METAL WORK.
Metal Work and its Artistic Design. Wyatt (M. D.), 1852.
Metallic Art. Wyatt (M. D.), 1855.

METAL WORKER'S Handy Book of Receipts. Brannt, 1890.
Metal-Plate Work. Millis, 1887.
Technical Instruction for Metal-plate Workers. Millis, 1888.

METALLIC OXIDES absorbed by Plants. Phillips, F. C., 1882.

METALLOIDS. Manual of the Metalloids. Apjohn (1864).

METALLURGY. Agricola, 1556, 1657; Armengaud, (J. E.), 1882; Balling, 1885; Dürre, 1877; Gwilt, 1877; Ledebur, 1879; Osmond, 1888; Percy (J.), 1863–68; Phillips (J. A.), 1874–91; Stölzel, 1863–86.
Abnormal efforts in metallic works. Considère, 1886.
Analysis. Åkerman (R.) and Särnström, 1888.

METALLURGY—*continued.*

Annuaire des mines et de la metallurgie françaises.
Periodical Publications, p. 11.
École centrale des Arts et Manufactures. Jordan (S.), 1875.
Explorers', Miners', and Metallurgists' Companion.
Phillips (J. S.), 1875.
Handbook. Silversmith (J.), 1867.
Introduction to study. Roberts-Austen (W. C.), 1884, p. 119.
Manual. Greenwood (W. H.), 1874, 1885.
Metallurgical Review. Periodical Publications, p. 19.
Metallurgy of Metals other than iron. Le Verrier, 1883–87.
Practical treatise. Crookes and Röhrig, 1868–70.
Preparation of military products. Recent progress. Baclé, 1889.
Products, Metallurgical. Boutmy, 1884.
Properties common to fluids and solid metals.
Roberts-Austen (W. C.), 1886, p. 120.
Records of Mining and Metallurgy.
Phillips (J. A.) and Darlington, 1857.
Revue universelle . . . de la métallurgie.
Periodical Publications, p. 24.
Royal School of Mines. Removal of the Metallurgical Department of, to S. Kensington. Percy (J.), 1879.
Special scientific knowledge, importance of, to the practical Metallurgist. Percy (J.), 1852.
System. Karsten, 1831–32.
Treatises. Gruner (L.), 1875–78; Overman, 1864.
Universal Review of Mining and Metallurgy.
Periodical Publications, p. 26.
Russian Works, iron, copper, and gold. Barry (H.), 1870.
Sheffield Technical School, Metallurgic Department of.
Thwaite (B. H.), 1892, p. 312.
United States National Museum. Metallurgy and Economic Geology department in the. Dewey (F. P.), 1890.

METALS.

Art. Barba (A. A.), 1738.
Art of Assaying. Cramer, 1744, 1764.
Corrosion of Metals during long exposure to sea water.
Andrews (T.), 1875.
Cutting, planing, and rolling Metal. Bodmer (J. G.), 1839.
Decorative treatment of Metal in Architecture.
Birch (G. H.), 1883.
Delta Metal. Le Chatelier (H.), 1889.
Elasticity and Viscosity of Metals. Thomson (Sir William), 1865.
Electrical resistance of Metals. Le Chatelier, 1809.
Heat dilatation of Metals from low temperatures.
Andrews (T.), 1887.

METALS—*continued.*

Impact Resistance of Metals, effect of Chilling on.
ANDREWS (T.), 1890.
Industrial applications, Metals and their chief.
WRIGHT (C. R. A.).
Industrial Study of Metalliferous Deposits. MOREAU, 1894.
Machine for testing the physical properties of Metals and Alloys.
EGLESTON, 1883.
Machinery for cutting and working in.
BODMER (J. G.), 1841, 1843.
Methods of treating and separating the metals contained in certain complex ores and metallic compounds.
MAXWELL LYTE, 1882.
Notes on Metals. WOOD (Thomas), 1868.
Palladium. Discovery of, and other substances found in combination with Platina. WOLLASTON (W. H.), 1805.
Physical properties of metals. LE CHATELIER, 1890.
Physically and socially considered. VIVIAN (H. H.), 1858.
Plane Metallic Surfaces, and the proper mode of preparing them.
WHITWORTH (Sir J.), 1840.
Platina (Crude), new Metal found in. WOLLASTON (W. H.), 1804.
Polishing of Metals. TRESCA (H.), 1874.
Progressive improvement and present state of the Manufactures in Metal. LARDNER, 1831–34.
Properties and treatment. BLOXAM (C. L.), 1870, 1882.
Punching of metals. KELLER (K.), 1888.
Relation between temperature and thermic colouration.
DECHARME, 1875.
Reports of the Committee on Metals, 1845–46.
PARLIAMENTARY..Papers, p. 486.
Report on Metals, Machinery, &c., British Chamber of Commerce, Paris, 1876. PARIS, p. 452.
Sheet metal worker's guide. CRANE, 1883.
Temperature, influence of, on the mechanical properties of metals.
LE CHATELIER (A.), 1889, '91.
Tidal streams, action of, on metals during diffusion of salt and fresh water. ANDREWS (T.), 1885.
Useful metals and their alloys. SCOFFERN (J., and others), 1857.

Cornwall and Devon, metalliferous deposits of.
HENWOOD (W. J.), 1843.
England. Metalliferous and Mining Industries, can they be revived and developed. BEWICK (T. J.), 1892.
Kumaon and Gurhwal, metalliferous deposits of, 1855.
INDIA, p. 122.
Pontgibaud, description of metal deposits and the silver lead of.
RIVOT (L. E.), and Zeppenfeld, 1851.

METALS—*continued.*

Russia, Metal Industries. LABZIN, 1893,
Sardinia. BALDRAGGO, 1854.
United States. Report of the tests of Metals for Industrial Purposes, 1882–90. UNITED States, p. 351.

METAPHYSICS. Metaphysical Analysis, revealing in the process of the formation of thought a new doctrine of metaphysics. TOMB (J. W.), 1846.

METEOROLOGY (GENERAL REFERENCES). BATEMAN (J. F. La T.), 1881; DOVE, 1837; POUILLET, 1840.
Air Currents. SMELLIE (T. D.), 1885.
Air Pressure, Reduction of, to sea level at elevated stations west of the Mississippi. HAZEN, 1882.
Air and Rain. SMITH (Robert A.), 1872.
Agriculture, Meteorology in its connection with. HENRY (Joseph), 1858.
Atmosphere, constitution of the. COXWORTHY, 1847.
—— Condition of the Earth and Atmosphere, 1845–47. COXWORTHY, 1848.
Atmospheric Observations for the use of the engineer. CUPPARI, 1888.
Bulletin, Meteorological. RIO de Janeiro, 1881–3.
Charts of meteorological data and remarks, 1874–76. METEOROLOGICAL Office, pp. 347, 348.
Clouds, modifications of. HOWARD (L.), 1865.
Complete Course. KAEMTZ, 1858.
Forecasting the Weather. JENKINS, 1887.
—— Forecasting by means of Weather Charts. ABERCROMBY (Hon. R.), 1885.
—— How to forecast the weather months in advance. COOPER (A. J.), 1890.
Glaisher's "Meteorological Corrections," deductions from. DRACH, 1851.
Handy Book. BUCHAN (A.), 1868.
Harmonic Analyser at the Meteorological Office. Its working. SCOTT (R. H.), and Curtis, 1886.
Hypsometry, Meteorology in its connection with. WILLIAMSON, 1868.
International Meteorological Committee Reports, 1880–1888. METEOROLOGICAL Office, p. 350.
Isobaric Curves, use of. Report, 1869. METEOROLOGICAL Office, p. 350.
Lectures. HOWARD (L.), 1837.
Manual. HERSCHEL (Sir J. F. W.), 1859.
Maritime Meteorology. Report of Conference, 1874. METEOROLOGICAL Office, p. 347.

METEOROLOGY (GENERAL REFERENCES)—*continued.*

Meteorological Journal for October, 1841.
WEBSTER (W. H. B.), 1841.

Meteorological Memoirs, 1876, etc. INDIA, p. 102.

Meteorological Office, Reports. METEOROLOGICAL Office.

Meteorological Register for the year 1833.
ROGERSON (W.), 1834.

Modern Meteorology. A series of lectures.
ROYAL Meteorological Society, 1880.

Monthly Meteorological Magazine, 1866, etc. SYMONS (G. J.).

Monthly Weather Review. PERIODICAL PUBLICATIONS, p. 19.

Notices, Meteorological. SMYTH (C. P.), 1851–2.

Ocean Meteorology. ALLINGHAM (W.), 1891.

Permanent Committee of First International Congress. Reports, 1874–79. METEOROLOGICAL Office, p. 350.

Photography in relation to Meteorological work.
WHIPPLE (G. M.), 1890.

Practical Meteorology. DREW (J.), 1855.

Principles. MÜLLER (J.), 1847.

—— Causes and principles of Meteorological Phenomena.
HUTCHISON (G.), 1835.

Received theories of rain, mist, dews, latent heat, solar rays, light and lunar influences. HART (E.), 1828.

Repertorium für Meteorologie. PERIODICAL PUBLICATIONS, p. 22.

Reports of Meteorological Committee of the Royal Society, 1867–78. METEOROLOGICAL Office.

Reports of the Meteorological Council of the Royal Society, 1878–91. METEOROLOGICAL Office.

Station Instructions for Meteorological Telegraphy, 1862.
PARLIAMENTARY..Papers, p. 486.

Tables, Meteorological. LOOMIS, 1868.

Telegraphs, Instructions for Meteorological.
METEOROLOGICAL Office, p. 346.

Telegraphic Weather Intelligence was sent, 1868–77, Return of places to which. PARLIAMENTARY..Papers, p. 486.

Vapour, Evaporation, Rainfall, and elastic force of.
MANN (J. R.), 1871.

Weather, Aids to the Study and forecast of, 1880.
METEOROLOGICAL Office, p. 348.

Weather Book. FITZROY, 1863.

Weather Cord. Description of an improved.
ARDERON (W.), 1746. App. 545.

Weather, Earliest Journal of the, 1337–1344. MERLE, 1891.

Weather. Observations on. TOPLIS (J.), 1849.

Weather Reports (Daily), 1872, etc.; (Monthly), 1884, etc.; (Quarterly), 1869, etc.; (Weekly), 1880. etc.
METEOROLOGICAL Office, p. 350.

METEOROLOGY (General References: Places).

Aden, Routes for Steamers from, to the Straits of Sunda, 1872. Meteorological Office, p. 350.

Alps. Observations on the Faulhorn and Mont Blanc. Bravais and Martins, 1851; Bravais, Peltier and Wachsmuth, 1844.

American Association of State Weather Services. American Association.

America (South). Meteorology of Cape Horn and the West Coast of South America, 1871. Meteorological Office, p. 347.

Antarctic regions, Meteorology of the, 1873. Meteorological Office, p. 347.

Arctic Regions, 1879–85. Meteorological Office, p. 347.

Atlantic Weather Charts for 1882–83. Meteorological Office, p. 349.

—— Charts showing the Mean Barometrical pressure over the Atlantic, Indian and Pacific Oceans. Meteorological Office, p. 349.

—— Forecasting by Means of Weather Charts of the Atlantic, Indian and Pacific Oceans, 1885. Meteorological Office, p. 348.

—— Meteorology of the North Atlantic, 1878. Meteorological Office, p. 347.

—— Meteorology of the part of the Atlantic Ocean lying North of 30° N., 1872. Meteorological Office, p. 347.

—— Physical geography of part of the Atlantic, 1876. Meteorological Office, p. 350.

Atlantic (North). Daily weather charts, 1883, &c. Atlantic Ocean.

—— North Atlantic between the parallels of 40° and 50° N., 1869. Meteorological Office, p. 350.

Baden. Baden, 1883.

Bangalore and the Province of Mysore. Puckle, 1861, 1868.

Bombay Presidency. Chambers (C.), 1878; India, 1888, etc., p. 112.

Bouches du Rhône, Department of the. Bouches du Rhone, 1889–91.

Brazil. São Paulo, 1891–2. São Paulo. Add. 532.

Brisbane. Diagram showing number of wet days from Jan. 1, 1860, to Dec. 31, 1885. Henderson (J. B.).

British Isles. Meteorological Atlas. Meteorological Office, p. 348.

—— Sunshine (Ten years') in the British Isles, 1881–90. Meteorological Office, p. 350.

—— Weather forecasting for. Toynbee (Capt. H.), 1892.

Canada. Reports of the Meteorological Office. Canada, 1872, p. 218.

METEOROLOGY (General References : Places)—*continued.*

Cape Colony. Report of the Meteorological Commission.
Cape Colony, 1861, etc., p. 221.

Cape Town. Report of Meteorological Committee.
Cape Town, 1837.

Clifton, Meteorology of. Burder, 1863.

Croydon Microscopical and Natural History Club Meteorological Sub-Committee's Report for 1893.
Croydon Microscopical, etc. Add. 494.

Cumberland and Westmorland, Lake District of, 1849, '51.
Miller (J. F.).

England. Sunshine Records of the United Kingdom for 1881.
Meteorological Office, p. 348.

—— Report, 1880. Marriott.

England, Scotland, Ireland and Wales. Glaisher, 1848–61.

—— State of Meteorological Science in England. Drew (J.), 1852.

English Meteorological Societies. Their History, 1823–1880, etc.
Symons (G. J.), 1881.

France, Coast of. Allard (E.), 1882.

—— Meteorology of France. Villeneuve (H. de), 1864. Add. 538.

Halifax. Eight years meteorology, 1866–1873.
Waterhouse (John), 1874.

India. Connexion of the Himalaya snowfall with dry winds and seasons of drought in India. Blanford, 1884.

—— Charts of the portion of the Indian Ocean adjacent to Cape Guardafui and Ras Hafun.
Meteorological Office, p. 349.

—— India Weather Review, 1891, etc. India, p. 103.

—— Meteorological Department, 1871–73, 1881–2, etc.
India, pp. 102–3.

—— Meteorology in India, 1876–90. India, p. 103.

Italy. Antinori, 1858.

Japan. Joyner, 1875; Meteorological Office, 1876, p. 347.

Kerguelen Island, 1879. Meteorological Office, p. 347.

Leipzig, Meteorological Conference at. Report, 1873.
Meteorological Office, p. 350.

London. Relation to the Epidemic of Cholera, 1855.
London, p. 262.

Madeira Meteorologic. Smyth (C. P.), 1882.

Madras. Reports of Meteorological Reporter, 1881–2, etc.
India, p. 123.

Nederlandsch Meteorologisch Jaarboek.
Periodical Publications, p. 20.

Netherlands Year-book, 1881. Holland.

Newport, Isle of Wight, 1841–56. Bloxam (C. L.), 1867.

METEOROLOGY (General References: Places)—*continued.*

New South Wales, Meteorological workers in.
Russell (H. C.), 1888.

New Zealand, 1871. New Zealand, p. 410.

—— Meteorological Reports, 1873, etc. New Zealand, p. 409.

Nottingham Meteorology, 1867–86. Tarbotton (M. O.).

Queensland, 1880. Queensland, 1881, p. 71.

Rome. Extraordinary heats observed there.
Byres (J.), 1768. App. 550.

—— Meteorological Congress. Report of Proceedings, 1879.
Meteorological Office, p. 347.

Smyrna, 1864–1874. Purser.

Stonyhurst College. Meteorological Report, 1860–63, and Results, 1865, etc. Stonyhurst Coll., 1861–1888, etc.

Sunbury, Middlesex Meteorological Register, 1795–1839.
Cowe, 1889.

United States. Naval Astronomical Expedition to the Southern hemisphere during 1849–52, vol. 6. Magnetical and Meteorological observations by Lt. J. M. Gillis.
United States, 1856, p. 341.

—— Meteorological Register from 1831 to 1842.
Lawson, 1851.

—— Meteorology. United States, p. 351.

Victoria Meteorological Reports, 1856–60. Victoria, p. 376.

Vienna. Central-Anstalt, 1854, '66. Vienna.

—— Meteorological Congress at. Report of Proceedings, 1874.
Meteorological Office, p. 347.

Whitehaven, Cumberland Meteorological Observations, 1849–52.
Miller (J. F.).

METEOROLOGY (Cyclones).

Arabian Sea, 1885. Daily Weather Chart.
Meteorological Office, p. 349.

Black Sea. Piddington, 1855.

India, 1888. India, p. 100.

—— Cyclonic Storms in the Bay of Bengal. India, p. 100.

—— Cyclone Tracts in the South Indian Ocean, 1891.
Meteorological Office, p. 349.

—— Cyclones in the South Indian Ocean. Notes on their form, 1873. Meteorological Office, p. 350.

—— Madras Cyclone of May, 1877. India, p. 122.

Manilla Cyclone of Oct. 20, 1892. Manilla.

Soonderbuns, Cyclone Wave in the. Piddington, 1853.

Southern Hemisphere, Moving Anticyclones in the.
Russell (H. C.), 1893.

Vizagapatam and Backergunge Cyclones, 1877. India, p. 133.

METEOROLOGY (Instruments).

Apparatus for obtaining telegraphically the readings of instruments placed at a distance from the observer.
Joly (J.), 1883.

Instructions in the use of meteorological instruments, 1875.
Meteorological Office, p. 347.

Treatise on Meteorological Instruments.
Negretti and Zambra, 1864.

METEOROLOGY (Observations).

Hourly Means of the Readings obtained from Self-recording Instruments at four Observatories, 1888–9.
Meteorological Office, p. 349.

Hourly Readings, 1874, etc. Meteorological Office, p. 350.

Instructions for taking Meteorological Observations.
James (Sir H.), 1860.

Maritime Conference for devising a uniform system of Meteorological Observations at sea. Brussels, 1853.

Meteorological and Physical Observations made in five balloon ascents in 1863. Glaisher.

Meteorological Observations at stations of the second order, 1878–87. Meteorological Office.

Meteorological Observations. Tarbotton (M. O.), 1881–85.

Meteorological Observations in tropical countries. Blanford, 1892.

Meteorological observations and experiments, Correspondence relating to the establishment of a Council for conducting, 1877. Parliamentary..Papers, p. 486.

Meteorological Observations, deductions. Drew (J.), 1850; Instruments. Drew (J.), 1850.

Meteorological Observations and Essays. Dalton, 1834.

Meteorological Observations at the Foreign and Colonial Stations, 1852–86. Meteorological Office, p. 349.

Meteorological Observers, Hints to. Marriott, 1881, '87.

Meteorological Table. Observations of the thermometer and barometer extended over a period of eighty years.
Woodcroft (B.) and Glaisher, 1860.

Reduction of Meteorological Observations.
British Association, 1843.

Report of Treasury Committee on the annual grant in aid of Meteorological Observations, 1877. Parliamentary..Papers, p. 486.

Royal Engineers, Meteorological Observations taken by the, 1853–4. Royal Engineers, 1855.

Royal Meteorological Soc. Climalological observations. Phenological Phenomena observations. Meteorological Record, etc.
Royal Meteorological Soc., 1875, etc.

Adelaide Observatory. Meteorological Observatory during the year 1879. South Australia, 1881, p. 228.

METEOROLOGY (OBSERVATIONS)—*continued.*

Africa (Southern), Instructions for making Meteorological Observations in. HERSCHEL (Sir J. F. W.).

Athabasca (Lake) and Fort Simpson, etc., Magnetical and Meteorological Observations at. LEFROY, 1855.

British Observatories. Air temperature and pressure. Harmonic analysis of hourly observations of, at. STRACHEY (Lt.-Gen. R.), 1893. Add. 535.

Brussels Observatoire Royal. Bulletin Meteorological. BRUSSELS, 1887.

—— Observatory at Brussels. QUETELET, 1841, 1867.

Cape Observatory. Meteorological Observations, 1841–46, 1871. CAPE Town.

Ceylon, 1881. INDIA, p. 115. Observations, 1880. INDIA, p. 115.

Cobham, Meteorological and Phenological Observations at, 1825–50. MOLESWORTH, 1880.

Dorpat. Observations, 1866–70. OETTINGEN, 1871.

Georgetown Observatory, Demerara. Monthly tables of daily means. SANDEMAN (P.), 1857.

Greenwich Meteorological Observations, 1836, etc., 1840–47. GREENWICH Observatory.

—— Results, 1848–58. Reduction, 1878. GREENWICH Observatory.

Haut-Rhin and the Vosges. Meteorological Observations, 1882–3. HIRN.

Hong Kong. Instructions for making meteorological observations. HONG Kong, 1883.

India, Meteorological Observations at Stations in, 1880–88, 1891, etc. INDIA, pp. 102–3.

—— Observations in the N. W. Provinces, 1875. INDIA, p. 127.

Lisbon. Observations. LISBON, 1881.

Liverpool. Observations at the Observatory, 1884–88. HARTNUP, 1889.

Madras. Observations, 1841–45. INDIA, p. 123.

Madrid. Royal Observatory, 1865–66. MADRID.

Marlborough, Observations at, 1888. MARLBOROUGH.

New South Wales. Meteorological Observations, 1885, etc. NEW South Wales, p. 402.

New Westminster, British Columbia. Meteorological Observations, 1860–61. JAMES (Sir H.).

—— At Stations of the Royal Engineers, 1853–59. JAMES (Sir H.).

New York State. Observations at sundry academies, 1855. NEW York State.

Nottingham. Observations, 1891. NOTTINGHAM.

—— Meteorological Observations. BROWN (A.) and BOOBBYER, 1889, etc.

METEOROLOGY (OBSERVATIONS)—*continued.*

Nottingham. Meteorological Observations.
BROWN (A.) and WHITELEGGE, 1887, etc.

Oxford University. Mean Height of Barometer and Thermometer with fall of rain at, during each month, 1828–1836.
OXFORD. App. 570.

Paris Observatory Meteorological Atlas, 1872–74. PARIS.

Pola Hydrographic Office. Meteorological Observations, 1864–81.
KNEUSEL-HERDLICZKA and Mirŏsevec.

—— —— Meteorological Instruments.
KNEUSEL-HERDLICZKA and Pichl, 1882.

Punjab. Meteorological Observations, 1867. INDIA, p. 129.

Rio de Janeiro. Annales meteorologicos, 1851–1856.
MELLO (A. M. de), 1858.

St. Domingo. Meteorological Observations made at Sanchez (Samaná Bay), 1886–88. METEOROLOGICAL Office, p. 349.

Stonyhurst College. Meteorological Report, 1861–63. STONYHURST.

Toronto University. Abstracts and results of meteorological observations from 1841–1871. TORONTO.

METEOROLOGY (STORMS).

Ascending whirlwinds in air and liquids COLLADON, 1887.

Circular Storms. ARMIT (1870).

—— Storms, their nature, classification, and laws.
BLASIUS, 1875.

Damage done by a thunderclap of exceptional intensity.
COLLADON, 1887.

Equinoctial gales. ARMIT (1870).

Hail Storms. RUSSELL (H. C.), 1892.

Hurricanes. PIDDINGTON, 1855.

—— Storm of Sept. 21 and Oct. 26, 1888 (Sydney).
RUSSELL (H. C.), 1888.

—— Storm of Oct. 13–14, 1881. METEOROLOGICAL Office, p. 348.

—— Sudden Squalls of Oct. 30 and Nov. 21, 1863.
STEWART (Balfour).

—— Storm of Nov. 17, 1866. DOVE, 1868.

—— Port of Calcutta. ADLEY, 1864.

Intensity of Storms ascertained by the calculation of barometric gradients. STEVENSON (T.), 1868.

Law of Storms. DOVE, 1862; PIDDINGTON, 1848, 1855.

——, with cause for the variable winds.
REID (Lt. Col. W.), 1838, '49.

Origin of electric flow in storm clouds. COLLADON, 1888.

Philosophy of Storms. ESPY, 1841.

Snowstorms of January 17th to 21st, 1881. ANONYMOUS, p. 55.

Tempest Prognosticator, Essay. MERRYWEATHER, 1851.

METEOROLOGY (STORMS)—*continued.*

Thunderstorms, waterspouts, etc. ADOLPH, 1864.
Thunderstorms, forecasting of, 1892. CONGER.
Thunder Storms. HARRIS (Sir W. S.), 1843.
——, destructive. Prussian Commission on. PRUSSIA, 1885–7.
Tornadoes, Character of six hundred. FINLEY, 1882.
Weather Charts and Storm Warnings. SCOTT (R. H.), 1876.
Weather telegraphy and storm warnings. Report, 1874. METEOROLOGICAL Office, p. 350.
Winter of 1862–63. DOVE, 1863.

Bengal Cyclone and Storm Wave, 1877. INDIA, p. 110.
British Islands, Return of Storms in the, 1874–83. PARLIAMENTARY..Papers, p. 486.
Cape of Good Hope, Gales in the Ocean District adjacent to the Report, 1882. METEOROLOGICAL Office, p. 348.
Edinburgh, Effect of Storm on Sea-walls or Bulwarks on the coast of. RANKINE (W. J. M.), 1848.
England (Southern), Change of mean daily temperature which accompanies Thunderstorms in. WHIPPLE (G. M.), 1890.
Hong Kong. Great Storm of 29th and 30th May, 1889. BROWN (S.).
India, Hailstorms in. BUIST, 1850.
—— Nature and Course of Storms in Indian Ocean, S. of Equator. THOM (A.), 1845.
—— Whirlwinds and dust-storms of India. BADDELEY (P. F. H.), 1860.
Italy, Thunderstorms in. RADDI, 1893.

METEOROLOGY (TEMPERATURE).

Relation of the Air and Evaporation Temperatures to the Temperature of the Dew Point, 1851. MILLER (J. F.).
Relations of the diurnal barometric maxima to certain critical conditions of temperature, cloud, and rainfall. BLANFORD, 1888.
Temperature (Surface) Chart, 1884. METEOROLOGICAL Office, p. 348.
—— Current and Surface temperature of the North Atlantic Ocean, 1872. METEOROLOGICAL Office, p. 347.
—— Charts of Surface Temperature, South Atlantic Ocean, 1869. METEOROLOGICAL Office, p. 346.
Temperature of the British Islands. BUCHAN (A.), 1871. Variability, SCOTT (R. H.), 1890.
—— Harmonic Analysis of hourly observations of Air Temperature and Pressure at British Observatories, 1891. METEOROLOGICAL Office, p. 349.
New South Wales. Isothermal lines showing mean shade temperature. NEW SOUTH WALES, 1892, p. 402.
United States. Isothermal Lines, 1871–80. GREELY.

METEOROLOGY (Wind).

Generation of Rain and production of Wind. Barlow (E.), 1717.
Influence of the Wind on Meteorological phenomena. Allard (E.), 1883.
Internal work of the Wind. Langley (S. P.), 1893.
Maury's Wind and Current Charts, a guide-book to. Taylor (Janet), 1855.
Methods of Wind Measurement. Hele-Shaw, 1881.
Pressure. *See* Wind Pressure.
Strong Winds and barometrical differences, connexion between, 1868. Meteorological Office, p. 350.
Trade Winds, on the cause of. Velschow (F. A.), 1890.
Treatise on the Winds. Ferral, 1889.
Wind in its Circuits. Armit (1870).
Winds and Monsoons. Capper (J.), 1801.
Winds at Sea. Maury, 1859.

Arabian Sea and North Indian Ocean, Winds and Monsoons of the. Dallas, 1887.
Atlantic (North), Winds, 1872. Meteorological Office, p. 350.
Bengal (Bay of), Charts showing the mean pressure, winds and currents, Bay of Bengal, etc. India, p. 102.
Bombay, Normal Winds of. Chambers (C.), 1869.
Europe (Western), Laws of the Winds prevailing in. Ley, 1872.
India (Northern), Winds of, in relation to the temperature and vapour-constituent of the Atmosphere. Blanford, 1874.
See also Barometer, Climate, Rainfall.

METRIC SYSTEM. *See* Measures, Weights, and Money.

MICROSCOPES. Sorby (H. C.), 1878.
Aepinus, new Microscopes invented by. Description. Aepinus (F. M. U. T.), 1784. App. 543.
Cantor Lectures on Microscopes. Mayall, 1886.
Euler's Achromatic Microscope. Chevalier (V.), aîné, 1825. App. 552.
History, Construction, and Application. Hogg (J.), 1869.
Lectures. Pereira (J.), 1854.
List of 2000 microscopic objects. Pritchard (A.), 1842.
Polarising Microscope. New form. Dick, 1890.
Solar Microscope. Anonymous, 1786, p. 44.
Technological and Microscopic Repository. Periodical Publications, p. 25.
Treatise on the use of the Microscope. Quekett, 1855.
Universal Microscope. Anonymous, 1786, p. 44.

MILITARY ART.

Aide-Mémoire to the Military Sciences. ROYAL Engineers, 1853–62.
Architecture, Military. Elements. GOLDMANN, 1643.
Art, Military, and History. ROCQUANCOURT (J.), 1831.
—— Art of War, practical and theoretical. RONDELET, 1805–10.
—— Application of Science to. WAUWERMANS (H.), 1869.
Contribution to the Theory of Military Mines and Explosives. HÖFER (H.), 1880.
Electricity applied to Military Art. GUN (Col.), 1889.
Field Fortification, Military Sketching and Reconnaissance Manual. ANONYMOUS, 1872. Add. 481.
Hasty Intrenchments. BURGOYNE (Sir J. F.), 1869.
Military Mines. Improved Systems of retaining the Earth. PASLEY, 1836.
Militia Sketch Maps. ADAIR, S., Baron Waveney, 1855.
Reports of Royal Commission on the system under which patterns of Warlike Stores are adopted, 1887. PARLIAMENTARY..Papers, p. 519.
Rifle and the Spade! or, the future of Field Operations. TYLER (H. W.), 1859.
Royal Engineer Officer's Duties in time of peace. WEBBER (Maj.-Gen. C.E.), 1869.
Sieges, Instruction in the conduct of, and in defence of Places. VAUBAN, 1740.
Strategy. THESIGER (Hon. F. A.), Lt.-Col., 1863.

Afghanistan, Military Operations in. AFGHANISTAN, 1843.
British Army in 1868. TREVELYAN (Sir C. E.).
British Empire, Policy and Institutions of. PASLEY, 1857.
Euphrates and Tigris, practicability of advancing an army from Europe into Asia, by the Provinces of. WINCHESTER (J. W.), 1840.
Europe, Military Commission to, in 1855–56, United States. MORDECAI (A.), 1861.
India, Military Works. Specifications, etc., for the Meerut, Agra, Morar and Bareilly Districts. INDIA, p. 103.
—— Siege of Lucknow, 1858. Engineering Operations. INDIA, p. 122.
—— Madras, Military Department. Reports, 1860. INDIA, p. 123.
Kaffraria, War in. ANONYMOUS, 1852, p. 50.
Moscow. Salle d'exercice. BÉTANCOURT, 1813.
Sebastopol, Sieges. FERGUSSON (J.), 1856.
Tong-King War. STAUNTON (S. A.), 1884.
United Kingdom, Militia. ADAIR, S., Baron Waveney, 1859.

MILITARY ART—*continued.*

United Kingdom. Organization and Duties of the Militia, United Kingdom. ADAIR, S., Baron Waveney, 1858.

United States. Military Life, History, etc. UNITED STATES, p. 341.

—— Military Academy. Annual Report of the Board of Visitors, 1887. Catalogue of the Library, 1876–82. Official Register of the Officers and Cadets, 1878–90. Regulations, 1877. UNITED STATES Military Academy.

—— War Department. Report on lines of communication between Southern Colorado and Northern New Mexico. UNITED States, 1876. Add. 537.

See also ARMY.

MILK, Adulteration of. MOTT, 1878.

MILLS AND MILLING. NATRUS, 1734–36; KROOK (G.), 1850; SCHWAMM, 1847; TELFORD (T.), 1798, p. 287; WIEBE (F. K. H.), 1843.

American Mill Construction. BOSTON Manufacturers Mutual Fire Insurance Co., 1883.

Art of building Mills. STURM, 1718.

Construction. BONOLIS (A.), 1875.

English Cotton Mills. Report. ATKINSON, E., 1883.

Gradual Reduction Milling. GIBSON (L. H.), 1885.

Mechanical Architecture. LINPERCH, 1727.

Mill-engines. THWAITE, 1891, p. 312.

Mill-gearing, Wheels, Shafts, Riggers, etc. BOX, 1869.

Mills and Millwork. FAIRBAIRN (Sir W.), 1861–63, p. 403.

Millwork Manual. RANKINE (W. J. M.), 1869.

—— Improvements in. IMISON, 1787.

—— and other Machinery. BUCHANAN (R.), 1823, 1841.

Millwright (Experienced). GRAY (A.), 1804, 1806.

—— Prices of Millwrights' work. HAVILAND (J.), 1846.

—— Young Millwright and Miller's Guide. EVANS (O.), 1821.

Rolling Mills. MEISSNER, 1881.

Shafts of Mills. BUCHANAN (R.), 1814.

Treatise on Mills. BANKS (J.), 1795.

Water Mills. BEATSON, 1798.

—— Whitelaw and Stirrat's Water Mill. Description. WHITELAW (J.), 1843.

MINERAL WATERS.

Henry, St. Clair, Johnson and Benton Counties, Missouri. WOODWARD (A. E.), 1890.

London. Bagnigge Wells. BEVIS, 1767.

Oxford. St. Clement's Artesian well. PRESTWICH, 1876.

Pougues. Mineral Waters. POUGUES.

United States Mineral Springs. PEALE (A. C.), 1886.

MINERALOGY. Bayle, 1869; Bergman, 1783; Beudant, 1874; Collins (J. H.), 1883; Erni, 1885; Phillips (W.), 1819–52, 1826; Selle (A. de), 1878.

Account of works on Mineralogy, published during the years 1875–89. Periodical Publications. Add. 528.

Descriptive Mineralogy. Bauerman, 1884.

Descriptive Catalogue of Minerals. Mawe, 1826.

Dictionary. Aikin (A. and C. R.), 1807–14.

Elementary course of Mineralogy. Ansted, D. T., 1850.

Elements. Daniell, 1845.

Engineer's Manual of Mineralogy. Varley (Mrs.), 1846.

Glossary. Bristow, 1867.

Index to Mineralogy. Readwin, 1867.

Lectures. Egleston, 1872. Syllabus of lectures, Clarke (E. D.), 1807.

Manual of Mineralogy. Aikin, 1815; Dana (J. D.), 1867, 1882

Microscopical Petrography. Zirkel (F.), 1876.

Mineralogist's Directory, United Kingdom. Hall (T. M.), 1868.

Neues Jahrbuch für Mineralogie, etc. Periodical Publications, p. 20; Periodical Publications. Add. 528.

Practical Mineralogy. Trimmer (J.), 1841.

—— Assaying and Mining. Overman, 1867.

Rudiments. Ramsay (A.), 1868.

System. Bauerman, 1881; Cronstedt, 1772; Dana and Brush, 1868.

Treatise. Mohs, 1825.

Value of an extended knowledge of Mineralogy and Mining. Smyth (Sir W. W.), 1852.

Year-book for Mineralogy, 1870–79 Steinmann (G.).

British Mineralogy. Sowerby (J.), 1804–17.

Cornwall. Pryce, 1778.

Cornwall and Devon. Collins (J. H.), 1871.

France. Mounet, 1780.

Great Britain and Ireland. Greg and Lettsom, 1858.

Pacific Coast. Melville (W. H.), and Lindgren, 1890.

Rocky Mountains. Cross and Hildebrand, 1885.

S. Pedro do Rio Grande do Sul. Mineralogy and Geology. Graça, 1883.

Shetland Islands and the Island of Arran. Jameson (R.), 1798.

Shropshire. Aikin, 1797.

United States. Foye, 1886.

MINERALS. *See* Ores and Minerals.

MINES (General References). Hopton, 1883. Mines and Collieries of the United Kingdom, children employed in. Anonymous, 1842, p. 42. Mines and Metallurgy in the time of the Romans. Leger. Mines and miners. Simonin (L.), 1867, 1869. Code. Féraud-Giraud. Mines and Mining, practical manual. Osborn, 1888.

Annales des Mines, 1816, etc. Periodical Publications, p. 10.

Annuaire des mines et de la Métallurgie francaises, 1876–77. Periodical Publications, p. 11.

Annuaire du Corps Royal des Ponts et Chaussées et du Corps Royal des Mines, 1824–26. Periodical Publications, p. 11.

Annuaire du Journal des Mines de Russie, 1835–42. Periodical Publications, p. 11.

Bill to provide for the constitution of Mining Boards, 1892, '93. Parliamentary..Papers, p. 487.

Boring, Paris Exhibition, 1889. Habets, 1892.

—— Application of Rock-boring Machinery and explosives in Mining. Darlington (J.), 1879.

Cables, Employment of, continuous for the descent into mines. Watteyne (V.) and Demeure, 1891.

Chaudron's system of sinking Pits for mining. Simon (H.), 1869.

Considerations on mines. Héron de Villefosse (A. M.), 1819, '22–40. Add. 507.

Copper Mines. Descent by ladders to the Great Consols Copper Mine near Truro. Boyman, 1840.

Depreciation of Mines. Matheson, 1884, '93.

Discovery of all sorts of Mines from Gold to Coal. Plattes (G.), 1738. Add. 528.

Folklore. Sébillot (P.), 1894.

Journal des mines. Periodical Publications, p. 17.

Labour in mines, Bill to restrict, to eight hours per day, 1889, 1890. Parliamentary..Papers, p. 487.

—— Organisation of labour. Ledoux, 1890.

Law of Mines and Minerals. Bainbridge (W.), 1878.

Legislation. Aguillon, 1886.

Life brigades for Mining Districts. Bagot (A.C.), 1883.

List of Mines worked in 1888, etc. Parliamentary..Papers, p. 486.

List of the Plans of Abandoned Mines, 1889, etc. Parliamentary..Papers, p. 486.

Management. Monnet, 1773.

Manuel de l'administrateur des Mines. Burin des Roziers, 1887.

Means of transport. Evrard, 1872.

Metalliferous Mines, Machinery for. Davies, (E. H.), 1894.

MINES (General References)—*continued.*

Musgrave and another *v.* Smith (Appeal in a case of Mine Trespass). Musgrave (J.) and Fisher, 1876. Add. 521.

Notes and Formulæ for Mining Students. Merivale, 1887.

Noxious Fumes. Report on the effects on the health of miners by the use of Nitro-Glycerine Compounds and Compressed Air in Mines. Victoria, 1885, p. 377.

Practical and theoretical treatise. Gumpertz and Lebrun, 1805.

Rents. Rental and Rateable value of Coal, Ironstone, and other Mines, England and Wales, 1890.
Parliamentary..Papers, p. 487.

—— Bill to provide for fixing a fair Rent in respect of Way-leaves and other Mining Easements, 1893.
Parliamentary..Papers, p. 487.

—— Reports by Her Majesty's Representatives abroad on Mining Rents and Royalties, 1887.
Parliamentary..Papers, p. 488.

—— Report of Commission to inquire into the condition of all Mines to which the provisions of Act 23 & 24 Vict. cap. 151, do not apply, 1864.
Parliamentary..Papers, p. 487.

Reports of Commissioner on the condition of the population in Mining Districts, 1844–53. Parliamentary..Papers, p. 487.

Reports of Inspectors of Mines, 1851, &c.
Parliamentary..Papers, p. 486.

Return of Rates and Wages in the Mines and Quarries in the United Kingdom, 1891. Parliamentary..Papers, p. 487.

Return of Number of Mines at Work under the Coal and Metalliferous Mines Regulation Acts, 1891.
Parliamentary..Papers, p. 487.

Return of the Plans and Sections of the Metalliferous Mines of the United Kingdom, 1865.
Parliamentary..Papers, p. 486.

Return showing the number of Women, Girls, Men, and Boys employed in and about Mines, 1887.
Parliamentary..Papers, p. 487.

Return showing the average number of Hours and days daily and weekly worked in and about Mines in the United Kingdom, 1890. Parliamentary..Papers, p. 487.

Revue universelle des mines. Periodical Publications, p. 24.

Royalties. Reports of Royal Commission on Mining Royalties, 1890–93. Parliamentary..Papers, p. 488.

Summaries of Statistical Information contained in the Reports of H.M. Inspectors of Mines, 1889, &c.
Parliamentary..Papers, p. 488.

Underground Workings. Return of the length of, and passages in principal Collieries and Metalliferous Mines in England and Wales, 1881. Parliamentary..Papers, p. 488.

MINES (General References)—*continued.*

Universal Mining Code for the use of Mining Co.'s Engineers, etc. Stevens (J.) and Corbett, 1890.

Valuation of Mines. Hoskold, 1877.

Working of Mines. Burat, 1855, '70, '76; Callon, 1874–76; Cambessédès, 1887; Combes, 1844–45; Evrard, 1879; Haton de la Goupillière, 1884–85; Salazar, 1869.

—— New Theory of Formation of Veins, with its application to the art of working mines. Werner (A. G.), 1809.

—— New extracting machine. Demanet, 1859.

—— Pithead gear of mine hoisting arrangements. Eichenhauer, 1877.

—— Science of working. Delius, 1778.

—— Use of compressed air in working. Cornet, 1878.

Aberllefenny Slate Mine. Foster (C. Le N.), 1882.

Africa, South, Mines, Photographs. South Africa.

Allendale East and West and Weardale Lead Mines. Address to miners. Sopwith (T.), 1846, p. 225.

Alston Moor, Weardale and Teesdale mining districts. Sopwith (T.), 1833, p. 224.

Andes (Great), Mining journey across. Rickard (F. I.), 1863.

Argentine Republic. Argentine; Hoskold, 1889;

—— Province of Mendoza. Lallemant, 1899.

Australia, South, Mines of. Austin, J. B., 1863; Dutton (F.), 1846; South Australia, 1890, p. 228.

Austria, Mines. Austria, 1878.

Austria-Hungary. Graphic tables of Output, 1855–66. Fritsch.

Ballarat School of Mines. Ballarat, 1876.

Belgium. Mines worked with or without concession. Belgium, 1835, p. 117.

—— Mine Regulations. Belgium, 1884, p. 117.

—— Statistics, 1881. Belgium, p. 117; Harzé, 1884–85.

—— Engineers of mines. Belgium, 1856, p. 117.

—— Police. Belgium, 1884, p. 117.

—— Reports. Belgium, 1837–39. Add. 484.

Bolivia and Brazil. Mine Management. Sturz, 1870.

Candemeña Mines, Chihuahua, Mexico. Report. Maynard, 1891.

Cerro de Pasco. Lloyd (J. A.), 1853.

Chontales Gold and Silver Mining Company. Chontales, 1866.

Claremont Peak gravel mine, called the Miriam and Caroline claims, U.S. Barry (J. D.), 1880.

MINES (General References)—*continued.*

Cleveland Mines. Roads maintained by Steel supports.
Steavenson (A. L.), 1888.

Cleveland Mining District, last 20 years.
Steavenson (A. L.), 1894.

Colorado Gold and Silver Mines. Fossett, 1880.

Columbia College, School of Mines. Columbia, 1879, etc.

Comstock Lode. Church (J. A.), 1879.

Comstock Mining and Miners. Lord (E.), 1883.

Consolidated Mines Adventurers. Consolidated, 1838.

—— Reply to Observations on the Statement of the Committee.
Taylor (John), 1838.

Copiapo. Lloyd (J. A.), 1852.

Cornwall. Moissenet; Pryce, 1778.

—— Deep mines in Cornwall. Their ascent and descent.
Royal Cornwall Polytechnic Soc., 1838,

—— Mining District from Chasewater to Camborne. Report of a survey. Thomas (R.), 1819.

—— Mining districts and the ores produced in them.
Symons (B.), 1884.

—— Photographs illustrating methods of working Cornish Mines.
Burrow and Thomas, 1893.

—— Quantities of water in the Cornish Mines.
Henwood (W. J.), 1843.

—— Cornwall and Devon. Principal mines and mining districts.
Thomas (Chas.), 1867.

Couvin in Belgium, Iron Works and mineral property at.
Sopwith (T.), and Smith, 1846.

Dannemora. Dannemora, 1841.

Dean Forest Iron Mines, Commissioners, Award and rules, etc., for working them. Address to Miners.
Sopwith (T.), 1838, p. 225; 1841, p. 224.

De Beers Consolidated Mines Report. De Beers, 1890.

—— Underground De Beers. De Beers, 1887.

Devon and Cornwall, Metalliferous Mines within the Stannaries of, now working. Return showing names, etc.
Devon (County of), 1890. Add. 496; Devonshire, 1890.

England, source of National wealth. Abbot (G.), 1833.

France, 1835, 1874. France, p. 437.

—— Metalliferous mines. Caillaux, 1875.

Hainaut. Hainaut, 1880–88.

Homer Mill and Mining Company, Homer Mining District.
Barry (J. D.), 1880.

India. Employment of Women and Children in Indian mines.
India, p. 103.

MINES (General References)—*continued.*

Italy. Italy, p. 147.

Joachimsthal. New tram system in the Werner shaft. Mixa (A.), 1884.

Linares mining District. Sopwith (T.), jun., 1882.

—— Notes on the Lead Mining. Thomas (J. L.), 1857.

London. School of Mines. Records. Geological Survey, 1852–53.

Madrid, Escuela de Minas. Madrid, 1877. Add. 517.

Mexico. Historic mines. Dahlgren, 1883.

—— Mexican Mine Associations. Rawson (Sir W.), 1825.

—— Real del Monte Mining Company. Buchan (J. H.), 1855.

New Spain. Ordinances, 1825. Mexico.

New South Wales. Mittagong. Fitzroy Iron and Coal Mines. Report on their present condition. Thomas (J. H.), 1859.

—— Annual Reports of Department of Mines, 1877, etc. New South Wales, p. 402.

—— Report of the Stocks and Brands Branch, 1889. New South Wales, p. 402.

—— Mines and Mineral Statistics. Lucas (J.), 1875.

New Zealand. Papers and Reports relating to Minerals and Mining. New Zealand, 1894. Add. 523.

Nova Scotia. Mines and Minerals. Fairbanks, 1864.

—— Reports, 1865, '67, '88. Nova Scotia.

Ober-und Unter-Harz. Hoppe, 1883.

Otago Mining Commission. Reports. Otago, 1871.

Ouro Preto School of Mines. Ouro Preto, 1884.

Paris. École des Mines. Programmes, etc., 1864, etc. Paris, p. 453.

Peru. Department of Aucacho and its mineral riches. Raimondi, 1873.

Pioche Mining and Reduction Company. Report on the property. Maynard, 1890.

Pribram mining region. Geological account. Göbl (W.), 1892.

Prussian States. Working, 1852–61. Althans, 1863.

Queensland. Reports. Queensland, 1882, 1892, p. 71.

—— Mineral Map. Queensland, 1886, p. 71.

Rio Tinto. Anciola, A. S., and Cossio, 1856.

—— Province of Huelva. Notes on the mines of Rio Tinto. Thomas (J. L.), 1861.

Rocky Mountains. Raymond (R. W.), 1871.

Russia, production in 1882. Karpenskie, 1884.

Saint-Léger-de-Peyre, Valmanière and Servières, Report, 1879. Paulet, 1879.

MINES (General References)—*continued.*

San Miguel. Randolph, 1879.
Sardinia. Mineral riches of the island of. Marchese, 1862.
Somorrostro. Bourson, 1878.
Spain. Spain, p. 235.
—— Working of mines. Galibern, 1871.
Staffordshire (South) Report. Midland Mining Commission, 1843.
Turkey, Regulations of the mines of. Turkey, 1861.
Tuscany. Iron and Tin Deposits, Campiglia mining district. Symons (B.), 1882.
United States. Iron Mines. Bell (Sir I. L.), 1875, p. 119.
—— Leading Mining Claims of the Whitewood Mining District in the Black Hills, Lawrence County Da. Janin, 1879.
Van Mine. Foster (C. Le N.), 1879.
Victoria. Underground Survey of Mines, Plans, and Sections. Victoria, 1879–81, p. 377.
Waratar and Penguin Mining District. Report. Waratah, Tasmania, 1884.

MINES (Accidents).

Accidents in Mines in Scotland. Bills to provide for a system of National Insurance. Scotland, 1888, '93, p. 175.
Accidents from premature explosion of gunpowder in blasting rocks, Cornwall. Paris (J. A.), 1817.
Causes and prevention. Bagot (A. G.), 1878.
Disasters in Mines. Macdonald, 1878.
Drakewall's Mine, Gunnislake, Accident, 1889. Drakewall's Mine.
Mining Accidents and their prevention. Abel (Sir F. A.), 1889 ; Richardson (Joshua), 1848.

MINES (Drainage). Direct acting underground steam-pumping machinery. Mitchell (S.), 1881.
Water-draining machines. Hauer (J. von), 1879.

MINES (Electricity in). Electricity applied to Mining operations. Rowan (F. J.), 1887.
Electrical Haulage. Chalon, 1888.

MINES (Explosions).

Coal dust. Means employed to combat its danger. Walteyne and Demeure, 1890.
Explosions in mines. Means of prevention. Somzée (L.), 1881.
Firing Mines. Anonymous, 1877, p. 54.
Minera Mine, near Wrexham. Report on an Explosion of Dynamite and blasting gelatine in, 1881. Wrexham.

MINES (Ventilation). Devillez, 1875; Gibbons, 1847.
Ventilation of Mines and Collieries. Reports, 1850.
Parliamentary..Papers, p. 488.
Capell patent mine ventilator. Iron Mines.
Bowling Iron Company.
Centrifugal Ventilators. Gendebien, 1884.
Mine Gases and Ventilation. Thomas (J. W.), 1878.
New Mine Ventilator. Struvé (W. P.), 1846.

MINING. Gwilt, 1877.
Almanack, 1860. Lever.
Berg und hüttenmännisches Jahrbuch, etc.
Periodical Publications, p. 12.
Berg und hüttenmännische Zeitung.
Periodical Publications, p. 12.
Cost Book, its principles and practice as applicable to mining.
Tapping (T.), 1854.
Drift Mining. Egleston, 1887.
Engineering, modern progress in. Bramall, 1884.
—— Practical treatise. Greenwell (G. C.), 1855, '69.
Engineering and Mining Journal.
Periodical Publications, p. 15.
Faults in strata, veins and beds. Köhler (G.), 1886.
Gases and Mining. Baker (J. P.), 1870.
Guide for Prospectors, Explorers and Miners.
Moore (C. W.), 1893.
Houghton's Compleat Miner. Part IV.
Houghton (T.), 1738. Add. 508.
Hydraulic Mining, Manual of. Wagenen (T. F. van), 1880.
Labour. Advantages of reducing the hours of a miner's labours.
Bayldon (R.), 1860.
Lectures. Callon, 1876–86.
Manual. Ihlseng, 1892.
Metallic mining. Bevan (G. P.), Industries, vol. 2.
Miner's Guide. Gordon (H. A.), 1889.
Miner's Handbook. Milne (John), 1893.
Miners' Pocket Book, a reference book for miners, mine surveyors, geologists, mineralogists, etc. Lock (C. G. W.), 1892.
Miners practical handbook. Silversmith (J.), 1867.
Miners' Schools and Mining Academies. Smyth (Sir W. W.), 1854.
Mining Acts. Tapping (T.), 1861.
Mining Almanack. Periodical Publications, p. 19.
Mining and mineral statistics. Smyth (R. B.), 1866.
Mining and Smelting Magazine. Periodical Publications, p. 19.
Mining Journal, etc. Periodical Publications, p. 19.

MINING—*continued.*

Mining Machinery. DAVEY, 1882
—— Descriptive treatise. ANDRÉ, G. G., 1877–8.
Mining Magazine and Review. PERIODICAL PUBLICATIONS, p. 19.
Mining manual. SKINNER (W. R.), 1893.
Mining Records. TAYLOR (John), F.R.S., 1829.
Mining Records, national importance of preserving. SOPWITH (T.), 1844, p 225.
Mining Records Office. Account of. SOPWITH (T.), 1843.
Mining Review. PERIODICAL PUBLICATIONS, p 19.
Mining tables. WHITBURN (W.), 1832.
Mining Terms (Scotch Glossary). BARROWMAN, 1886.
—— An English and German Dictionary. RÖHRIG (E.), 1881.
Nystagmus, and its relation to position at work and manner of illumination. SNELL (S.), 1892.
Potts' Mining Register. PERIODICAL PUBLICATIONS, p. 21.
Practical Mining described. RICKARD (G.), 1869.
Records of Mining and Metallurgy. PHILLIPS (J. A.), and Darlington, 1857.
Progress of Mining. DICKINSON (J.), 1887; FOSTER (C. Le N.), 1891.
Science of Mining. SERLO, 1878.
Surveying (Mine). BROUGH, 1888, 1892.
Universal Review of Mining. PERIODICAL PUBLICATIONS, p. 26.
Water-pressure engines for. DAVEY, 1880.

America. Mining Machinery and treatment of Ores in American Colonies. AUSTRALIA, 1889.
—— American Institute of Mining Engineers. AMERICAN INST. OF M. ENGINEERS
—— Practical American Miner. BADDOW and Bannan, 1886.
Australia (Western). Mining handbook. WOODWARD (H. P.), 1894.
Belgium. Mining and Metallurgical industries, 1861–75. BELGIUM, p. 117.
Bristol Mining School. Lectures, 1857. BRISTOL.
British Colonies, Mining Industries of the. FOSTER (C. Le N.), 1887.
British Mining. HUNT (R.), 1884.
California. Mining Bureau. Bulletins. Reports of the State Mineralogist. CALIFORNIA, 1884, 1888.
—— Hydraulic Mining in California. BOWIE (A. J.), 1878, 1885.
—— Mining débris in Californian Rivers. BOWIE (A. J.), jun., 1887.
—— California and Nevada. Report on Mining. THUREAU (G.), 1879.

MINING—*continued.*

Caradon and Liskeard District. History and Progress of Mining in. Webb and Geach, 1863.
Cornwall. Mining District. Rocks. Phillips (J. A.), 1875.
—— Suggestions for the formation of a Miners' Permanent Club and Relief Society for Cornwall and Devon. Foster and Pike, 1885.
English and Mexican Mining compared with respect of Profits. Taylor (John), 1838.
Malmesbury reservoir site, Mining under, and under railway reserves authorized, 1871. Victoria, p. 376.
Michigan Mining School. Reports of Director, 1886, etc. Michigan. Paper on. Wadsworth (M. E.), '94.
New Zealand. Report on Mining Industry, 1887, etc. New Zealand, p. 410.
Nova Scotia. Mining Industries. Heatherington, 1874.
Pacific States of North America. Hittell, 1861.
Rocky Mountains, Mining Industry. Raymond (R. W.), 1871.
Ste. Étienne, School of Miners. Prospectus. St. Étienne, 1867.
Scotland. Early records. Cochran-Patrick, 1878.
Spain. Mining Ordinances. Gamboa, 1830.
Tasmania Mines Office, and the Mining Industry Report. Tasmania, 1884, 1887
—— West Coast Mining Industry. Tasmania, 1890.
Triano, Mining District of. Disposal of excreta and refuse in. Gill (W.), 1885, '86.
United Kingdom Relative danger of coal and metal mining in the. Foster (C. Le N.), 1885.
United States. Mining Industries. Pumpelly, 1880.
—— Mining Laws and regulations thereunder. United States, 1881, p. 351.
—— Working Placer Deposits. Egleston, 1886.
Victoria. Minerological Surveyor's First Report. Victoria, 1853, p. 376.
—— Mining Reports, 1856–90. Victoria.

MINTS.

European Mints, Inspection of. Report. Napier (J. M.), 1870.
Japan. Imperial Mint, Osaka, Japan. Report. Japan, 1872.
Madras. Report, 1859–60. India, p. 123.
Royal Mint. Report from the Select Committee, 1837. Parliamentary..Papers, p. 488.
—— Report of Commissioners, 1849. Parliamentary..Papers, p. 488.
—— Report on Changes in the Management, 1852. Parliamentary..Papers, p. 488.
—— Annual Reports of the Deputy Master of the Mint, 1870, etc. Parliamentary..Papers, p. 488.

MISSIONS. London City Mission, 1893, p. 280.

MOLES. *See* Breakwaters.

MONEY. *See* Measures, Weights, etc.

MONUMENTS.

Conservation of Ancient Monuments and Remains.
Royal Institute of British Architects, 1888, p. 139.

National Monuments and Works of Art, 1841, Report of Select Committee on. Parliamentary..Papers, p. 488.

Public Monuments. Daly, 1861.

—— Of all ages and all peoples. Lubersac, 1775.

Rude Stone Monuments. Fergusson (J.), 1872.

Société Française pour la Conservation des Monuments. Address.
Cheverau, 1837.

Abury and Stonehenge, Antiquities of. Rickman (J.), 1840.

Austrian Commission on Art and Historical Monuments.
Austria, 1875.

Bunker's Hill Obelisk. Plans and Sections of.
Willard (S.), 1843.

Greece. Ancient Monuments. Ruins of the monuments.
Le Roy (J. D.), 1770.

Nelson. Competition for the erection of the Nelson Monument.
Goldicutt, 1841.

Spain. Arab and Moorish Monuments of Cordova, Seville, and Grenada. Prangey, 1837.

Statues. Peter the Great at St. Petersburgh. Mechanical means adopted for its erection. Ceffalonie, 1777.

Stonehenge. Jones (Inigo), 1655.

Washington. Will the Washington Monument stand?
Goodridge, 1885.

MOON. *See* Astronomy.

MORTAR. John (J. F.), 1819; Smith (Chas. G.), 1875; Thomason Civil Engineering Coll., 1862–4.

Adherence of stones and bricks placed in a bath of mortar.
Morin, 1838.

Art of building with mortar (concrete).
Coignet, 1855, 1861; Lebrun, 1843.

Calcareous cements, Mortars and. Proper materials for their manufacture. Vicat (L. J.), 1828.

Cause of the hardness of Mortar.
Faujas de St. Fond (B.), 1778. Add. 500.

Composition of Mortars. Treatise. Vicat (L. J.), 1856.

Constitution of Hydraulic Mortars. Le Chatelier (H.), 1887.

MORTAR—*continued.*

France, 1890. FRANCE, p. 437.
Hydraulic Mortar. ALEXANDRE, 1890 ; MICHAELIS (W.), 1869.
Hydraulic and Common Mortars and Lime Burning. Essays. TREUSSART (Gen.), etc., 1829, '42.
Limes, concretes and ordinary mortars. Researches. VICAT (L. J.), 1818.
Romans. Composition and use by the. LA FAYE, 1777.
Rudimentary treatise. BURNELL, 1850.
Sea Works, Mortars in. FERET, 1893.

MORTUARIES.

Hornsey, Report on proposed mortuary buildings. HORNSEY Local Board.
Paris. Morgue, Report on the different freezing apparatuses with a view to the preservation of dead bodies. PARIS, 1880. Add. 525.

MOSAIC. Art of Mosaic, Ancient and Modern. WYATT (M. D.), 1847.

MOSAIC PAVEMENTS. Roman tesselated Pavement at Thruxton, Hants. Conjectures. THRUXTON, 1823.

MOSS-EARTH. Origin, qualities and cultivation of Moss-earth. ACTON (W.), 1811.

MOTION.

Callen and Ripley's Multiplying Rotative Motion for multiplying and diminishing Speed. CALLEN and Ripley, 1855.
Motion of a solid in a fluid. CRAIG, 1879.
Motive Force. New source. FAVARO, 1874.
Moving forces. CAUS, 1615.
Perpetual Motion. ROMANO (A.), 1870.
Power in. ARMOUR, 1875.
Rectilinear into rotary motion, Method of converting. BOOTH (Rev. J.), 1845.
Vibratory Motion. EVERETT, 1882.
See also DYNAMICS.

MOTOR CARS. *See* STEAM TRACTION ON ROADS.

MOTORS.

Construction of Motors. ARMENGAUD (J. E.), 1863–65.
Electric Motor. ATKINSON (P.), 1894.
Hydraulic Motors. COURTOIS, 1865.
—— Experiments. FRANCIS (J. B.), 1855.
—— Hydraulic and Steam Motors. Treatise. ARMENGAUD (J. E.), 1844.

MOTORS—*continued.*

Motors. Turbines and Pressure Engines. BODMER (G. R.), 1889.
—— Use on the Canal de l'Aisne à la Marne. GÉRARDIN, 1872.
—— Water or Hydraulic Motors.
HUET (A.), 1872–76; BJÖRLING, 1884.
Industrial Motors. A Study. SCIAMA (G.), 1881.
Motive power for small industries.
KNOKE (J. O.), 1887; MUSIL, 1883.
Motors employed for transport. COLLIGNON, 1891.
Munich. Machinery Exhibition, 1888. SCHRÖTER.
Small Motors.
CLAUSSEN, 1891; HEK (P.), 1880; KERNOT, 1879.
Steam Motors without fire. FRANCQ and Lamm, 1889.

MOUNTAINS.

Height of mountains, Method of computing the, from observations of the Barometer or the Boiling point of Water.
GEORGE, 1873.
Heights of Mont Blanc and Monte Rosa determined by barometric and geodesic measures. DELCROS, 1851.
Yorkshire. PHILLIPS (J.), 1853.

MUMMIES. History of Egyptian Mummies.
PETTIGREW (T. J.), 1834.

MUNICIPALITIES.

Acts, Municipal Corporations. RAWLINSON (C.), 1856.
Municipal monopolies and their management.
SINCLAIR (A. H.), 1891.

Arbroath. Memorial by the Magistrates. ARBROATH, 1824.
Aston, Manor of, Local Board. Surveyor's Report of Works executed during 1880–81. ASTON. Add. 482.
Birmingham. Report of the Borough Surveyor to the Paving and Street Improvement Sub-Committee. TILL (W. S.), 1874.
Bolton, Manchester and Salford. Improvement.
WILLIAMS (B.), 1845.
Bombay. Report, 1867–68. INDIA, p. 111.
—— Quarterly List, 1889. INDIA, p. 111.
Calcutta. Administration Reports, 1867–68. INDIA, p. 114.
Croydon Borough. Petition against a Bill for making further provisions for the good government of.
CROYDON, 1884. Add. 494.
—— Improvement Act, 1890. CROYDON.
Forfar, Memorial by the Magistrates of. ARBROATH 1824.
Frankfort-on-Main Board of Works. FRANKFORT ON MAIN, 1872.
Godalming. Improvement of the town. GODALMING, 1825.

MUNICIPALITIES—*continued.*

Great Grimsby Improvement Bill. HAWKSLEY, 1853.

Guildford Corporation Act, 1886. GUILDFORD.

Halifax, Nova Scotia. Report of the Civil Engineer for 1872–73. KEATING.

Hanover. City and buildings. UNGER, 1882.

Ireland. Reports on Municipal Corporations, 1835. IRELAND, p. 141.

Leeds. Borough Accounts, 1878. DERRY (W.).

London. Decorations and Embellishments for the City of London. ANONYMOUS, 1754, p. 45.

—— Government. Resolutions at the Lambeth Vestry, 1874. FOWLER (F. H.), 1870.

—— Indexes to Remembrancia (1593–1640). OVERALL, 1870.

—— London and the Kingdom. SHARPE (R. R.), 1894. Add. 533.

—— Metropolis Local Management Act, 1855, with notes. SMITH (Joshua Toulmin), 1855.

—— Metropolis Local Management Acts, 1855 and 1856. SCOTT (J. J.), 1855.

—— London Local Management Act, 1855, Amendment Act, 1862. LONDON, p. 262.

—— Mayor and Corporation of the City of London. Letters *circa* A.D. 1350–1370. SHARPE (R. R.), 1885.

—— Metropolis and its municipal administration. SMITH (Joshua Toulmin), 1852.

—— Municipal Government of the Metropolis, 1870. NEWTON, W

—— Municipal London. FIRTH, 1876.

—— Proposed improvement in the Metropolis. FINCH, 1861.

—— London's Roll of Fame. LONDON, p. 253.

—— London and Westminster Improved. Plans. GWYNN (J.), 1766.

Madras. Income and Expenditure of the Municipal Commissioners, 1859. INDIA, p. 122.

Manchester Improvements. FAIRBAIRN (Sir W.), 1836, p. 402.

Manchester and Salford. Association for the Promotion of the Amalgamation of. Reports, etc. ASSOCIATION for the Amalgamation of Manchester, etc., 1888 and '89. Add. 482.

Milan. SORMANI, 1882.

Montreal. Reports of the City Surveyor, 1877, &c. MONTREAL.

Nelson, Lancs. Forms of tender, conditions of contract and specifications for various improvement works for Corporation. NELSON, Lancs., 1894. Add. 522.

New York's recent development. Review of. NEW YORK City, 1892. Add. 523.

Newport Improvement Bill. Minutes of Evidence, 1876. NEWPORT, MON.

MUNICIPALITIES—*continued.*

Newton, Mass. Reports of City Engineer, 1892, etc. NEWTON, Mass.

Oldham. Borough Improvements, 1880. Plans and Sections. OLDHAM.

—— Surveyor's Report of Works, 1880. OLDHAM.

—— Fall of the Oldham Cotton Mill and part of the Prison at Northleach. Report, 1845. OLDHAM.

—— New Streets and Buildings Committee. Report, 1880. OLDHAM.

Paris. Improvements. HOREAU, 1868.

—— Municipal Council of Paris. Reports, etc. RAMBUTEAU 1834–37. Statement. HAUSSMANN, 1866.

—— Study on its administration. SAY (H.), 1846.

Pittsburg's Progress, Industries and Resources. THURSTON (G. H.), 1886.

Poplar and Blackwall Acts, 1812, 1817. POPLAR.

Quebec. BAILLAIRGÉ, 1878.

Rangoon. Report, 1889–90. INDIA, p. 130.

St. Pancras, 1890. Condition before 1856, and works executed, etc., since. SCOTT (W. B.), 1890.

Scotland. Boundaries of its cities, towns, etc., in respect to the Election of Members of Parliament. SCOTLAND, 1832, p. 174.

Scottish Royal Burghs. Report from the Committee of the House of Commons on Petitions. SCOTLAND, 1803, p. 175.

Shanghai Municipal Council. Reports, etc., of the Budget. SHANGHAI, 1870–1.

Shoreditch Improvement Bill. Report. SHOREDITCH, 1871.

Spezia in relation to health. RADDI, 1888.

Stockport. Borough Surveyor's reports to the Highways and Sewers Committee, 1891, etc. STOCKPORT.

—— Set of forms, notices, etc., compiled to properly carry out the Building Bye-Laws at. STOCKPORT, 1893.

Sunderland (Borough of) Act, 1885. SUNDERLAND.

Swansea. Further Improvements in. GRANT-FRANCIS, 1874.

Sydney. Yearly reports of the Surveyor and Engineer, 1889, etc SYDNEY, p. 292.

Toronto. Report by the City Engineer, including works performed and expenditure for same. TORONTO, 1882–92.

West Ham Corporation (Improvement) Bill, Select Committee on. WEST HAM, 1888.

—— Local Government Board, Report. WEST HAM, 1888.

Wolverhampton Specifications and Reports. THOMS (G. E.), 1877–82.

See also LOCAL GOVERNMENT, PUBIC WORKS.

MUSEUMS.

Educational uses of Museums. FORBES (E.), 1853.

Ashmolean Museum, Oxford. Memorial. RIGAUD (S. P.), 183. App. 573.

Australian Museum, Sydney. AUSTRALIAN Museum, 1890.

Bradford. Report, 1885. BRADFORD.

British Museum, plan for better management. MILLARD, 1886.

Hawkins Museum of useful and mechanical Inventions, Great Titchfield Street. Catalogue and plan. HAWKINS (J. I.), 1808. App. 561.

Indian Museum, on the measures required for the efficient working of. WATSON (J. F.), 1874.

London. Museum of Economic Geology. GEOLOGICAL Survey.

Madras. Central Museum Reports, 1853, 1855–56, 1859–60. INDIA, p. 123–4.

—— Catalogue of Mollusca of Southern and Eastern Asia, 1858. INDIA, p. 124.

—— Catalogue of the Library, 1856. INDIA, p. 124.

Madrid. Museo español de Antiguedades. DELGADO, 1874–77.

New South Wales. Museums of Technology, Science and Art. Report. NEW SOUTH WALES, 1880, p. 401.

New Zealand. Reports on the Colonial Museum, 1873, etc. NEW ZEALAND, p. 409.

—— Catalogue of the Colonial Museum Library, 1890. NEW ZEALAND, p. 409.

N.W.P. and Oudh Provincial Museum. Minutes of Committee, 1883–88. INDIA, p. 122.

Parkes Museum of Hygiene, South Kensington, 1881. Catalogue. PARKES Museum.

Perak Museum Notes. PERAK Museum, 1893–4. Add. 527.

Philadelphia, Project for a Technological Institute and Museum of useful arts in. NYSTROM, 1875.

Royal Irish Academy Museum, Descriptive catalogue of the Antiquities of Stone, Earthen and Vegetable materials in. WILDE (W. R.), 1857.

—— Catalogue of the antiquities. ROYAL Irish Academy, 1857, p. 141.

Royal United Service Institution, History. BURGESS, 1887.

South Kensington Museum. Catalogues of Machinery, Models, etc. (Patent Museum.) SOUTH Kensington Museum, 1863, '94. Add. 534.

—— Catalogue of Machinery, Models, Drawings, Tools, Building Materials, Munitions of War, Science, Library, Ship Models, Marine Engineering. SOUTH Kensington Museum, 1867–91.

MUSEUMS—*continued.*

United States National Museum. Catalogue of Minerals and Synonyms, 1889, and Preliminary descriptive catalogue of the Systematic Collections in Economic Geology and Metallurgy, 1891. UNITED States National Museum, p. 358

MUSIC.

Education (Musical). New System. LOGIER, 1810.
Essay on Musick. TURNER (W.), 1724.
Handel Festivals, 1859, 1862. Programmes. CRYSTAL Palace.
Mathematical elements of music. AIRY (Sir G. B.), 1868, p. 19.
Uniform Musical Pitch. HERSCHEL (Sir J. F. W.), 1859.

MUSICAL INSTRUMENTS. BEVAN (G. P.), Industries, vol. 11.
Exhibition of 1851. POLE, 1857.
Claviole or finger-keyed viol, history and resuscitation of. HAWKINS (J. I.), 1845 ; HAWKINS (J. I.), 1845. App. 561.
Violins, Violas, and Violoncellos, Making of. SCHAUM (J. O. H.).

N.

NAMES. Report on Surnames in Ireland, 1894. IRELAND, p. 141.

NATURALISATION. Lord Brougham's application in 1848 for French letters of Naturalisation. HILL (M. D.), 1869.

NATURE.

Beauties, harmonies and sublimities of. BUCK (C.), 1821.
Constants of Nature. Mammalia. BABBAGE, C. (1853).
General Laws in all the works of Nature. JULLIEN (M. A.), 1844.
Natural History. Genesis. NÄGELI, 1865.
Reciprocal relations of the grand agents of Nature. KLEIN, 1886; SCHWOERER, 1886.
Spectacle de la Nature. ANONYMOUS, 1744–53, p. 56.

NAUTICAL ALMANAC. Haversines used in computing lunar distances. HANNYNGTON, 1876.

NAUTICAL AND HYDRAULIC EXPERIMENTS. BEAUFOY, 1834.

NAUTICAL ASTRONOMY. *See* ASTRONOMY; NAVIGATION.

NAUTICAL TERMS in English and French. DELBOS, 1889.

NAVAL ARCHITECTURE. *See* SHIPBUILDING.

NAVIGATION. MARTIN (W. R.), 1888; ORTOLAN, 1878; THOMSON (Sir William), 1889–94.

Electrical Navigation. DARY, 1882.
Elements. GUILHAUMON, 1891.
Great Circle Sailing. FITZROY, 1858; RUSSEL (R.), 1852.
High Speed navigation. ARMSTRONG (R.), 1859.
Hurricanes. PIDDINGTON, 1853, 1855.
Improved Navigation, or some inventions to find a ship's true course always, a ship's latitude at any hour, and the longitude at sea, etc. ANONYMOUS, 1741. App. 544.
—— A fluid quadrant for the latitude and an everlasting horometer for finding the longitude. ROWE (Jacob), 1725.
Improvement, chiefly with respect to the instruments used at sea. MAITLAND, 1750.
Inquiries tending to the improvement of Navigation. GENEVOIS (J. A.), 1760. App. 558.

NAVIGATION—*continued.*

Instruments for observing the stars on the sea.
SAVÉRIEN (A.), 1752.
Law of Storms. PIDDINGTON, 1848, 1855.
—— Attempt to develope, with the view to practical use in Navigation. REID (Lt.-Col. W.), 1838, 1849.
Manual. NAPIER (R. A.), 1877.
Maury's plan for improving Navigation. WROTTESLEY (Lord), 1853.
Nautical Astronomy. JEANS (H. W.). 1849, 1876.
Naval Machinist. LIGNAROLO, 1894.
Practical Navigation. NORIE, 1839, '52; RAPER, 1849, 1870.
Responsibilities of Navigation and Log Books.
HOLT (H. F.), 1891.
Rudder, sail and steamboat. RÜHLMANN, 1891.
Sailor's Seabook, rudimentary treatise on. GREENWOOD (J.), 1865.
Steam Navigation, Oceanic. FLACHAT, 1866.
System of Navigation. NORWOOD, 1685.
Tables for Navigation and Nautical Astronomy.
RIOS (J. de M.), 1809.
Treatise. BYRNE (O.), 1876.

Baltic. Sailing directions for the Baltic Sea and the Gulf of Finland. FLINT, 1854.
Bristol Channel. Sailing Directions. DENHAM, 1839.
Burmah. Creek Navigation from Akyab to Tounghoop, 1856.
INDIA, p. 114.
Danish Pilot. ZAHRTMANN (C. C.), 1853.
France and maritime revolution of the 14th to 16th century.
MARGRY, 1867.
—— French Coasts, 1802–46, 1874. FRANCE, p. 437.
Havre to Paris. BÉRIGNY, 1826.
India Directory. Sailing Directions. HORSBURGH, 1855.
Ireland, north-east, north and north-west, Sailing Directions.
MUDGE and Frazer, 1842.
Ivelchester and Langport Navigation Act, 1795. IVELCHESTER.
King's Lyn and Cambridge. BADESLADE, 1766.
Liverpool, Chart of the Approaches to, 1835–83. DENHAM, etc.
Lorraine. BILISTEIN, 1764.
Lynas Point to Liverpool, Sailing Directions. DENHAM, 1840.
Northern Seas, Pilot for the, and Mediterranean.
LAURIE (R. H.), 1839–46.
Rotterdam to the Sea, improvement of. BARNARD (J. G.), 1872.
Schuylkill Navigation Company Report to the Stockholders.
SCHUYLKILL Navigation, 1845.
Scotland Steam and Inland navigation. Maps.
SCOTLAND, 1860, p. 175.

NAVIGATION—*continued.*

Spain. COELLO, 1855.

Stamford Junction Navigation. Report. TELFORD (T.), 1810, p. 287

Sydney to Torres Strait, Sailing Directions for the inner route from. KING (P. P.), 1847.

United Kingdom. REDMAN (J. B.), 1872.

United States. Explanations and sailing directions to accompany the Wind and Current charts, by Lieut. M. F. Maury. UNITED States, 1853, p. 352.

Wales, Sailing directions for the coast of. SHERINGHAM (W. L.), Robinson and Denham, 1843.

NAVIGATION (AERIAL). *See* AERIAL NAVIGATION; BALLOONS.

NAVIGATION (INLAND). *See* INLAND Navigation.

NAVY.

Ancients, Navies of the. RONDELET (J.), 1820.

Annual (Naval). PERIODICAL PUBLICATIONS, p. 20.

Archæology (Naval). JAL, 1840.

Arsenal (Naval), Construction at Northfleet. NORTHFLEET, 1810.

—— Desiderata in. BENTHAM, 1814.

Atalanta (H.M.S.) Committee. ATALANTA.

Balance Sheets and Accounts of Victualling Yard Transactions, 1880–83. PARLIAMENTARY..Papers, p. 491.

Brazil. Material. MAURITZ, 1882.

British Navy. BRASSEY, 1882.

—— Unarmoured Ships. BRASSEY, 1875.

—— British Fleet, growth, achievements, and duties. ROBINSON (C. N.), 1894. Add. 531.

Construction (Naval). FRÉMINVILLE, 1864.

Deal. H.M. Naval Yard, Prices for erection and completion of building. DEAL, 1800.

Debates and Proceedings in both Houses of Parliament on Naval Affairs, 1889. PARLIAMENTARY..Papers, p. 488.

Engineers' (Royal Naval) Notebook, Steam branch afloat. HARVEY (J. R.), 1888.

Engineering (Naval) in Great Britain, Improvements in. TOBIN (J. A.), 1883.

Engineers' Guide to the Royal and Mercantile Navies. ANONYMOUS, 1866, p. 45.

Engineers of Royal Navy. ANONYMOUS, 1859, p. 45.

England's Navy. ANONYMOUS, 1877, p. 40.

—— Letters to the First Lord of the Admiralty. HALSTED (E. P.), 1864.

NAVY—*continued.*

England, France, America, and Russia, Navies of.
BOYNTON (C. B.), 1865.
England Unarmed. Appeal to both Houses of Parliament.
HALSTED (E. P.), 1865.
Estimates, 1869, etc. PARLIAMENTARY..Papers, p. 489.
—— 1891–92. PARLIAMENTARY..Papers, p. 489.
—— Reports of Select Committee, 1848, 1888.
PARLIAMENTARY..Papers, p. 489.
France. Progress. DUPIN, 1820.
—— Département de la Marine. 1864–76. FRANCE, p. 437.
Great Britain. Naval, military and financial resources.
HOSEASON, 1868.
Holland. HOLLAND, p. 65.
Military Marine, 1888–9. WEYL (E.)
Modern War Ships. WHITE (Sir William Henry), K.C.B., 1887.
Nautical Magazine. PERIODICAL PUBLICATIONS, p. 20.
Naval Intelligence. ROGERS (C. C.), 1884.
Naval Papers. BENTHAM, 1795–1801, 1827.
Naval Philosophy. ANONYMOUS, 1691. Add. 480.
Present State of the Navy. ANONYMOUS, 1885. Add. 481.
Programme, New Naval. ARMSTRONG, 1889.
Rate Book. Victualling Marine and Army Transport, for valuing provisions, lights for service afloat, officers mess traps, seamen's clothing, etc., 1891–2.
PARLIAMENTARY..Papers. Add. 626.
Regulations and Instructions relating to Her Majesty's Service at Sea, 1806. PARLIAMENTARY..Papers, p. 488.
Royal and Mercantile Navy. PERIODICAL PUBLICATIONS, p. 20.
Royal Naval Engineers: a series of articles bearing on the Order in Council April 30, 1877.
ANONYMOUS, 1877. Add. 481.
Royal Navy, speedy and effectual building. EVERETT (G.), 1694.
Royal Victoria Victualling Yard, Deptford. Plan.
DEPTFORD, 1838, 1858.
Russia. Morskoĭ Sbornik [Journal of the Russian Navy].
PERIODICAL PUBLICATIONS, p. 19.
Science (Naval). PERIODICAL PUBLICATIONS, p. 20.
Screw vessels in H.M. Navy, dimensions of.
BOURNE (J.), 1852, 1867.
Speeches in the House of Commons.
SAMUDA (Joseph D'A.), 1869.
State of Navy. PIM (B.), 1877.
Steam Navy. Report from Select Committee on, 1849.
PALIAMENTARY..Papers, p. 488.
—— Inefficiency of, for general service and the purposes of war.
HOSEASON, 1866.

NAVY—*continued.*

Steam Navy. Report of Select Committee, 1849. PARLIAMENTARY..Papers, p. 488.

—— Causes that retard the progress of our Steam Navy. RAMSAY (W.), 1851.

Stores (Naval), Contracts for. BENTHAM, 1779–1813.

—— Victualling Marine and Transport Stores, Medical Stores, 1885. PARLIAMENTARY..Papers, p. 491.

Tactics (Naval). HOSTE, 1697, 1834.

Timber, State of Navy, 1803. PARLIAMENTARY..Papers, p. 491.

Training Ships. PIM (B.), 1877.

United States, Navy of, causes of its failure. DICKERSON, 1864.

—— United States Navy. UNITED States, pp. 352, 3, 4.

Warfare, Naval, with Steam. DOUGLAS (Sir H.), 1858.

See also SHIPS AND STEAM VESSELS.

NEWSPAPERS.

Index to "The Times," 1862, etc. PALMER (S.).

United States. History of newspaper and periodical press. NORTH (S. N. D.), 1884.

NITRATE.

Nitrate of Soda, its importance and use as a manure. STUTZER (A.), 1887.

Atacama, Deposits in the desert of. PISSIS, 1878.

Chili. British Capital. GANA, 1889.

Santa Isabel Nitrate Works, Toco, Chile, etc. HUNTER (G. M.), 1892.

Nitric Acid Plant. GUTTMANN, 1891.

NITROUS FUMIGATION. Report on Discovery, 1801. PARLIAMENTARY..Papers, p. 491.

NUISANCES.

From noxious trades on the shores of the Thames. BALLARD (E. D.), 1874.

In connection with various manufacturing and other branches of Industry. BALLARD (E. D.), 1882.

Noxious vapours. Report of Royal Commission, 1878. PARLIAMENTARY..Papers, p. 492.

Noxious Trades and Occupations, France. Report on Laws and Ordinances in force, 1855. PARLIAMENTARY..Papers, p. 491.

Southwark and Vauxhall Water Company. Report on a Dust-Sifting Nuisance adjoining their works at Battersea. SOUTHWARK and Vauxhall Coy., 1872.

Sydney Nuisances Act, 1876. SYDNEY, p. 272.

NUMBERS. Advantage of a Collection of, to be entitled "The Constants of Nature and Art." BABBAGE (C.), 1832.

NUTRITION (ANIMAL). GILBERT (Sir J. H.), 1876.

O.

OBELISKS.

Disintegration of the Egyptian Obelisk in the Central Park, New York. Egleston, 1886.

Egyptian Obelisks. Gorringe, 1885.

Luxor (in Paris). Godwin, 1836. Transportation from Egypt to Paris. Lebas, 1839.

Rome, removal. Zabaglia and Fontana, 1743.

OBSERVATION, importance of cultivating habits of. Hunt (R.), 1851.

OBSERVATORIES.

Armagh, effects produced by the vibration of a railroad. Robinson (T. R.), 1852.

—— Report at the annual visitation. Robinson (T. R.), 1842.

Benares. Account of the Brahmin's Observatory. Barker (Sir R.), 1777. App. 547.

Berlin and Brussels. Difference of longitude. Encke, 1859.

Brussels. Quetelet, 1840, 1847, 1866–75.

—— Difference of Longitude between the Observatories of Brussels and Greenwich. Airy (Sir G. B.), 1855, p. 19.

Cambridge. Determination of the Longitude by means of galvanic signals. Airy (Sir G. B.), 1853, p. 17.

—— Northumberland Equatorial, and dome. Airy (Sir G. B.), 1844, p. 15.

Dun Echt. Publications. Dun Echt, 1876–77.

Edinburgh. Present state and future prospects. Astronomical Inst. of Edinburgh, 1846. App. 546.

Greenwich Royal Observatory. Letter in reply to the calumnies of Mr. Babbage in his book "The Exposition of 1851." Sheepshanks (Rev. R.), 1854.

—— How the distance between the Meridians of Greenwich and Paris Observatories has been determined. Roy (Maj.-Gen. W.), 1790. App. 575.

—— Relative situations of Greenwich and Paris Observatories. Mode proposed to be followed to determine. Roy (Maj.-Gen. W.), 1787. App. 574.

Kew. History. Scott (R. H.), 1885.

—— Report of Committee, 1883, etc. Kew Observatory.

Makerstoun. Report on the publication of observations. Broun (J. A.), 1850.

—— Observations in Magnetism and Meteorology. Broun and Russell, 1845–49.

OBSERVATORIES—*continued.*

Madras. Report for 1859–60. INDIA, p. 124.
Oxford. Memorials. RIGAUD (S. P.), 183–. App. 573.
Paris. Mémoire. PARIS, p. 460.
—— Meridian of the Observatory. ACADÉMIE des Sciences, 1744.
Rio de Janeiro. Observatory. Annals and Annual. RIO de Janeiro, 1882–3 and 1892.
St. Helena. Observations made by Gen. Sabine, 1840–49. ST. HELENA.
St. Petersburg. Central Physical Observatory Annals, 1884, &c. ST. PETERSBURG.
Sydney. Description of the Star Camera. RUSSELL (H. C.), 1892.
—— Description of the Star Camera. SYDNEY, 1892, p. 274.
United States Naval Observatory. Founding and Progress, 1873. NOURSE; UNITED States, p. 352.

See also ASTRONOMY, METEOROLOGY.

OCEAN CURRENTS. Action of Ocean Currents. BABBAGE, C., 1856.

OFFICES (PUBLIC). Report of Sub-Committee of the Commission for the concentration of the Public Offices, 1867. PARLIAMENTARY..Papers, p. 498.

See also PUBLIC WORKS.

OIL. BADDOW and Bannan, 1866; BEVAN (G. P.), Industries, vol. 4.
Animal and vegetable oils. Methods for determining the value of. COLEMAN, 1874.
Application of Oil to break the force of the sea at the entrance to harbours, etc. SHIELDS (J.), 1883.
Cotton-seed oil industry, United States. HILGARD, 1884.
Distilled Oils. Treatise. GESNER, 1865.
Friction of lubricating Oils, Measurement of. WOODBURY (C. J. H.), 1880
Fuel, Oil. DUDLEY (C. B.), 1888.
Horology. Practical considerations on the oils employed in. ROBERTS (H.), 1851. App. 574.
—— Extract of virgin oil for Horology and Delicate Machines. MAURIN, 1821. App. 568.
—— Revillon's proposal to secure oval Clock and Watch oil. FRANCŒUR (L. B.) 1822, p. 558.
Hydro-carbon oils from coal, and other bituminous substances, manufacture of. ANTISELL (1860).
Manufacture, and fitting up of Oil Mills. KNÄBEL, 1881.
Mineral Oils as fuel. RANKINE (W. J. M.), 1867.

OIL—*continued.*

Oil Mill machinery. SAMUELSON (A.), 1858.
Sewage sludge, extraction of Oil from. BURNS (W.), 1887.
Spraying of Oil. CLOUÉ, 1887.
Standard Oil Company. CAMDEN, 1883.
Tallow and some Commercial Oils, examination of, especially for acidity. DEERING, 1884.

OIL ENGINES.

Text Book. DONKIN (B.), Jun., 1894.
Petroleum Engine. CONRADI, 1893.
—— Theoretical and Practical treatise on. WITZ (A.), 1892–5. Add. 539.
Shirlaw's Vertical Petroleum Engine. Instructions for fitting, etc. SHIRLAW (A.) and Co., 1887.
Spiel's Patent Petroleum Engine. Instructions for working, etc. SHIRLAW (A.) and Co., 1887.

OIL LIGHTING (LONDON). Defries' Oil lighting on the Holborn Viaduct. HAYWOOD (W.), 1889, p. 31.

OIL MINES.

Aniche Oil Mines. VUILLEMIN (E.), 1878.
France. Working of rich beds. AMIOT, 1873.
Pennsylvania, Visit to the Oil Districts of. CADELL (H. M.), 1891. Add. 490. GILLELEN, 1864.
Punjab Oil Region, Topography of. LYMAN, 1872.

OLIVE. Products and Cultivation. BROTHERTON, 1857.

OMNIBUS COMPANY (PARIS). Reports, 1882, etc. PARIS, p. 452.

OPERA GLASSES. Observations. KITCHINER (W.) 1818, 1824. App. 564.

OPTICS. FERGUSON (J.), 1799; WEBER (Wilhelm), 1892–94.
Contribution to the Theory of the Angle of Sight. RIEDL (J.), 1827.
Diffraction of an Annular Aperture. AIRY (Sir G. B.), 1841, p. 20.
Diffraction of an object glass with circular aperture. AIRY (Sir G. B.), 1835, p. 20.
Double Refraction. FRESNEL, 1825.
Elementary treatise. POTTER (R.), 1851.
Experiments demonstrating some elementary laws. TERQUEM (A.), and Trannin, 1876.
Eye, Power of the, to adjust itself to different distances when deprived of the crystalline lens. HOME, 1802.

OPTICS—*continued.*

Forgotten fact. HORNER, 1832.
Horizontal Refraction. Quantity of, with a method of measuring the dip at sea. WOLLASTON (W. H.), 1803.
Iceland Crystal, oblique refraction of. WOLLASTON (W. H.), 1802.
Images, formation of, in the dark. HUNT (R.), 1842.
Instruments, Optical. HIGGINS (W. M.), 1879. General laws. MAXWELL, 1858.
Lectures, Experimental. Syllabus. AIRY (Sir G. B.), p. 15.
Lenses, Optic, competition relative to the construction of a machine fit for grinding. BRÉGUET, 1825.
—— Achromatism of the four-lens eye piece. SANG (E.), 1887.
Manual. GALBRAITH and Haughton, 1856.
Newton's Rings formed between two transparent substances of different refractive powers. AIRY (Sir G. B.), 1832, p. 21.
Optical properties of muriate of soda, fluate of lime and the diamond. BREWSTER, 1816.
Optical (new) and mineralogical property of calcareous spar. BREWSTER, 1816.
Optical Telegraph. NANSOUTY, 1888.
Physical optics. Experiments and calculations relative to. YOUNG (Dr. T.), 1804.
Prismatic reflection, Method for examining refractive and dispersive powers by. WOLLASTON (W. H.), 1802.
Problems in optics. OZANAM (J.), 1750. App. 570.
Single vision with two eyes. WELLS (W. C.), 1818.
Treatises. BREWSTER, 1831 ; GRIFFIN (W. N.), 1842.
Undulatory theory of optics. AIRY (Sir G. B.), 1831, p. 17.

ORDNANCE. *See* ARTILLERY.

ORE CRUSHERS.

Choice of coarse and fine crushing machinery and processes of Ore treatment. CHARLETON, 1892–94.
Rolls for crushing Ore. EGLESTON, 1885.

ORES AND MINERALS (GENERAL REFERENCES).

Allanite. Experiments on. THOMSON (T.), 1830.
Deposits, Ore. COTTA, 1870 ; PHILLIPS (J. A.), 1884.
Dressing, Ore, Europe. Practice. KUNHARDT (W. B.), 1884.
—— Handbook for Mining Engineers. LINKELBACH, 1887 ; RITTINGER, 1867–73.
Earthy and other Minerals. DAVIES (D. C.), 1884.
Enargite. EGLESTON, 1882.
Examination of Minerals. BERZELIUS, 1822.

ORES AND MINERALS (General References)—*continued.*

Metallic Ores, smelting and purifying. Barber (J.), 1856.
Metalliferous minerals. Davies (D. C.), 1880.
Mineral and Metalliferous Deposits. Fuchs and Launay, 1893.
Mineral Statistics, 1861–70. Howard (W. F.).
Mineral Surveyor and Valuer's Guide. Lintern, 1877.
Mineral Veins, faults in, Hoefer's method of determining. Raymond (R. W.), 1882.
—— Origin of. Phillips (J. A.), 1871.
Mineral Wealth and Railroad development. Foster, 1872.
Mining and Ore dressing Machinery. Lock (C. G. W.), 1890.
Ore and Stone mining. Text Book of. Foster (C. le N.), 1894. Add. 501.
Practical Observations on Mineral Veins. Leithart, 1838.
Quantitative Analysis. Rammelsberg, 1874.
Reproduction of Mineral substances by the diffusion of superposed liquids. Monier, 1880.
Revista Minera. Periodical Publications, p. 23.
Rock-Forming Minerals. Petrographical Tables an aid to their microscopical determination. Rosenbusch (H.), 1889
Royalties. Metalliferous Mineral, of England. Abbot (G.), 1840.
Separation of Minerals. Büttgenbach, 1892. Add. 489.
Sodalite, a new mineral from Greenland. Chemical Analysis. Thomson (T.), 1835.
Treatise on mineral substances. Rivot (L. E.), 1861–6.
Treatise on the getting of minerals. Lupton, 1893.
Treatment of metallic minerals. Rivot (L. E.), 1871–73.

Argentine Republic, Minerals of. Rickard (F. I.), 1870.
British Columbia, Mineral wealth of. Dawson (Sir G. M.), 1888.
Carolina, North, Minerals of. Genth, 1891.
Clausthal. Dressing Establishments. Kutscher, 1873.
Exmoor Mineral Property. Report. Llewellin, 1855.
India, Minerals of. Calvert, 1870.
—— Mineral resources of. Pearson (A. W.), 1883.
Kumaon, Mineral deposits in, 1856. India, p. 121.
Leadville, Ores of. Ricketts (L. D.), 1883.
—— Their modes of occurrence as illustrated in the Morning and Evening Star Mines. Ricketts (L. D.), 1883.
Liége, Mineral Industry. Province of Liége, 1878–87. Report.
Luxemburg, la Situation de l'industrie minérale et metallurgique. Luxemburg, 1880–83.
Namur, Mineral Industry of, 1879–1887. Namur.
New South Wales. Liversedge, 1888.

ORES AND MINERALS (General References)—*continued.*

New South Wales. Minerals. Swinney (A. J. G.), 1884.

—— Mineral Map and general statistics, 1876. New South Wales, p. 402.

—— Mineral Products, 1882–87. New South Wales, p. 402.

—— Mineral Wealth, 1890. New South Wales, p. 402.

New Zealand, Mineral Resources of. Bramall, 1883.

Ontario, Mineral Resources of. Report of Royal Commission, 1890. Ontario.

Scotland, Mineral Survey along the tract of the Union Canal. Lauder and Campbell, 1814.

Sicily, Minerals in, 1808. Sicily.

Tasmania. North Western and Western Mineral Deposits. Report. Tasmania, 1881–1884.

United Kingdom, Mineral Statistics, 1853–78. Hunt (R.)

—— Mineral Statistics of the United Kingdom for 1853–81. Geological Survey, 1882, etc.; Parliamentary..Papers, p. 488.

—— Tabular return showing the Annual Output of the principal Minerals in the United Kingdom, 1860–90. Parliamentary..Papers, p. 487.

United States, Mineral Industry. Statistics, etc., in the U.S.A. and other countries. Rothwell (R. P.), 1893.

—— Mineral Resources. Day (D. T.), 1886, etc.; Sutro (A.), 1868; United States, 1883, etc., p. 347; Williams (A.), junior, 1882–4.

—— Mineral Resources and the necessity of a rational system of mining with reference to the Comstock Lode and Sutro Tunnel in Nevada. Sutro (A.), 1868.

Virginia, Carolina and Georgia, Minerals of the States of, traversed by the Richmond Railroad Company. Richmond and Danville, 1889.

Wales (South), Mineral productions of. Booker, 1848.

ORES AND MINERALS (Concentration).

Concentration of all kinds of Ores. Küstel, 1868.

Concentration of Ores: introducing a new dry Centrifugal Concentrator. Stanfield (R.), 1892.

Dry Concentration of the Sulphides of the Barrier Range, New South Wales. Clarkson (T.), 1893.

—— Treatment by the Clarkson-Stanfield Concentrator. Clarkson (T.), 1893.

ORES AND MINERALS (Jigging). English *versus* Continental system of Jigging. Munroe, 1889.

Close sizing before jigging. Richards, 1894. Add 530

ORES AND MINERALS (VANNING). Lührig Vanner or Percussion Table. LÜHRIG Coal and Ore Dressing Co., 1893.

ORNAMENT. Polychromatic, of Italy. ADAMS E. (1849).

ORNITHOLOGY of New Zealand. BULLER (W. L.), 1865, 1882.

ORTHOGRAPHIC PROJECTION. Elementary treatise. BINNS, 1857, 1876.

OSCILLATION, laws. WEBER (W.), 1827.

OXYGEN Gas. SCHONBEIN, 1858. Changes produced on, by Respiration. ALLEN (W.), and Pepys 1808.

P.

PADDLE WHEELS.

Buoyant float Paddle Wheel. ANONYMOUS, 1837, p. 41.
Effects and stability of W. Morgan's Paddle Wheels. MORGAN (W.), 1834.
Improved. CRIVELLI (J.), 1827.
Losses of Propelling Power in the Paddle Wheel. THURSTON (R. H.), 1866, p. 310.
Patent reefing Paddle Wheels. Description. HALL (S.), 1841.
Screw Blades, application of, as floats for Paddle Wheels. ADAMS (W. G.), 1865.
Working of Paddle Wheels. HUET (A.), 1891.

PAINTING.

British Institution. Recollections, 1805–59. SMITH (Thomas), 1860.
History. MEMES, 1834.
Landscape painting (Art of) in water-colours. ROWBOTHAM (T. and T. L.), 1855.
Landscape (English) art in 1887. DAWSON (A.)
Landscape painting and sketching from nature in water colours. CHASE, 1863.
Preservation of paintings in picture galleries. PRICE (D. S.), 1865.
Principle of Relief. HAUCK (G.), 1885.
Water-Colour Painting. PENLEY (A.), [1878?]

PALÆONTOLOGY. *See* GEOLOGY.

PAPER. BEVAN (G. P.), Industries, vol. 8.
Bamboo as a Paper-making material. ROUTLEDGE (T.), 1875.
German Government Laboratory, Charlottenberg. Paper testing. HERTZBERG, 1892.
Petitions from booksellers on the high price of paper, 1801. PARLIAMENTARY..Papers, p. 494, 1836–77.
Japanese Paper Manufacture. MONROE, 1876.
—— Manufacture in Japan. JAPAN, 1871.
Manufacture of Paper. HOFMANN, 1873; PAYEN, etc., 1881; PROUTEAUX, 1885.
Paper-making processes and Machinery. BENNETT (J. B.), 1892. Add. 485.
Paper Making. DUNBAR, 1881.
Paper and Paper Making, ancient and modern. HERRING (R.), 1855.
Text-book. CROSS and Bevan, 1888.

PAPIER MACHÉ. BEVAN (G. P.), Industries, vol. 3.

PARASITES (HUMAN). READWIN, 1870.

PARCELS. Electrical Parcel Exchange System.
BENNETT (A. B.), 1892.

PARKS. Boston, Mass. Reports of Commissioners. BOSTON, 1888.
London Parks, Open Spaces and Thoroughfares.
MACKENZIE, 1869.
—— State of Hyde Park. DONALDSON (G.), 1849.
—— State of Regent's Park. DONALDSON (G.), 1849.

PARLIAMENT.
Canada. Appeal on the Rectification of Parliament.
FLEMING (S.), 1892.
Cape Colony Acts of the Parliament of the Colony.
CAPE Colony, 1884, etc., p. 221.
—— Votes of the House of Assembly. CAPE Colony, p. 221.
—— Votes of the Legislative Council. CAPE Colony, p. 221.
Expenses incurred by Canal, Tramway and Dock Companies, etc., in promoting and opposing Bills, 1872–82.
PARLIAMENTARY..Papers, p. 466.
House of Commons. COMMONS, 1833, '68, '71.
—— Alterations in reference to the acoustic and ventilating arrangements. REID (D B.), 1837.
—— Obstructions to the execution of the Orders of the House of Commons. Report from the Committee.
PARLIAMENTARY..Papers, 1803. Add. 526.
Parliamentary Companion, 1837. VACHER (C.), and Son.
Private Bills. Standing Orders, 1837, etc. Lists, 1870, etc. Returns, 1890. PARLIAMENTARY..Papers, p. 466.
Standing Orders of Parliament for Session 1884–5, etc. Epitome of. WYATT (Sir R. D.)

PARLIAMENTARY DEBATES, 1868 (Hansard), Debates. 1886.
PARLIAMENTARY..Papers, p. 474.

PARLIAMENTARY PAPERS.
Catalogues, 1696–1834. General Index, 1832–44, etc. Index to Parliamentary Notices, 1865–76.
PARLIAMENTARY..Papers, pp. 494–5.
—— Reports of Committees of the House of Commons, 1715 to 1801. PARLIAMENTARY..Papers, p. 495.
—— Précis of Official Papers, 1880.
PARLIAMENTARY..Papers, p. 495.

PARLIAMENTARY REPRESENTATION.
True method in large constituencies. CLARKE (C. C. P.), 1873.
Suffrage (Universal) and Vote by Ballot in Australia. AUSTRALIA, 1867.
PASTEBOARD, Manufacture of. PROUTEAUX, 1885.

PATENTS FOR INVENTIONS. DAY (St. J. V.), 1870; HARDINGHAM, 1891.
General Patent Company. Prospectus, 1858. GENERAL Patent.
Glasgow Philosophical Society. Remarks by Sir W. Thomson on the petition to the Lord Chancellor. GLASGOW, 1877.
Institute of Patent Agents, Work of the. GRAHAM (H. H.), 1890.
Patent Office. Report on building a Patent Office, Library, and Museum. COMMISSIONERS, p. 284.
—— Illustrated Journal of the Patent Office. COMMISSIONERS, p. 284.
—— Indexes. COMMISSIONERS, p. 283, 284.
—— Report on the Library and Museum. COMMISSIONERS, p. 284.
—— Patent Office Museum, 1875. COMMISSIONERS, p. 284.
—— Patent Office Receipts, 1881–2. COMMISSIONERS, p. 284.
—— Report of the Comptroller-General, 1884, etc. PARLIAMENTARY..Papers, p. 495.
—— Supplement to Series of Letters Patent, 1858. COMMISSIONERS, p. 284.
—— Titles of Patents, 1617–1852. COMMISSIONERS, p. 284.
Patentability of Inventions. MERVIN, 1883; SPENCE (Wm.), 1851.
Proceeding, mode of, to obtain Patents. COMMISSIONERS, p. 283.
Protection, expediency of, for inventions. BRAMWELL, 1875.
Question (Patent), under Free-trade: a solution of difficulties by abolishing or shortening the inventors' monopoly. MACFIE, 1863.
Subject-matter of Letters Patent for Inventors. WEBSTER (Thomas), Q.C., 1841, '44, '51.

PATENTS LAW.
America (South), Patent Laws of Latin America. AMERICA, 1888; BORDES (L. G.), 1889.
Bills. Report of Select Committee of the House of Lords on Amended Bills, 1851. PARLIAMENTARY..Papers, p.495.
Cases. Abstract of reported Cases. GOODEVE, 1884.
—— Digest of Patent Cases. HIGGINS (C.), 1875.
—— Cases relating to Letters-Patent. MACRORY, 1855.
—— Law Reports of Patent Cases. CARPMAEL (W.), 1843.
Colonies, extension of Patents to the. COMMISSIONERS, p. 283.
Conveyancing, Patents. Collection of precedents. MORRIS (R.), 1887.

PATENTS LAW—*continued.*

Europe, etc. Laws of Patent Privileges of Europe, United States and Dutch West Indies. LOOSEY, 1849.

Germany. PIERRON, 1891.

Great Britain. KEITH, 1891.

—— Designs and Trade Marks, British and Foreign. ABEL (C. D.), and Imray, 1886.

—— Granted for England, 1844–46. PRINCE and Haddan, 1844–49.

—— British. Renewal fees. NEWTON (A. V.), 1888.

India. Patents and their relation to the wants of. REMFRY and REMFRY, 1881.

India, Ceylon, Straits Settlements and Hong Kong. REMFRY (H. H.), 1885.

Law connected with Letters Patent for Inventions. JOHNSON (J. and J. H.), 1871.

Papers, Bills, etc., 1851–52. PARLIAMENTARY..Papers, p. 495.

Patent Bill, 1877. MACFIE, 1877.

—— Patent Law Reform Bill, Draft, 1881. PATENT LAW Reform Soc.

—— Bill to amend the Law, 1888. PARLIAMENTARY..Papers, p. 495.

—— Patent Agents Bill, 1894. Special Report on. PARLIAMENTARY..Papers. Add. 526.

—— Law of Patents. CARPMAEL (W.), 1832, 1852, 1860; DANSON and Dempsey, 1843; GODSON, 1823; RAE, 1865; SIMONDS (W. E.), 1893.

—— Analysis of Patent and Copyright Laws. NEWTON (A. V.), 1884.

Patent Law Amendment Act, 1852. COMMISSIONERS, p. 284.

—— Acts, 1852, 1859. PARLIAMENTARY..Papers, p. 495.

Patent Law and Practice. ANONYMOUS, 1871, p. 51; BILLING and Prince, 1845; FROST, 1891; JOHNSON (J. and J. H.), 1879, '90; LAWSON (W. N.), 1889; WEBSTER (Thomas), Q.C., 1841, '52.

—— Action of Patent Laws in promoting Invention. ABEL (C. D.), 1864.

—— New Patent Law, 1883. JOHNSON (J. and J. H.)

—— New Patent Law: its History, Objects, etc. WEBSTER (Thomas), Q.C., 1852, '53 and '54.

—— Operation, 1864. NEWTON (A. V.).

—— Policy of Patent Law. DIRCKS, 1869; SPENCE (William), 1869.

—— Present State of the Law. SPENCE (William); THOROLD (W.), 1829.

—— Patent Law Reform. ANONYMOUS, 1893, p. 51; BENNETT (J.), 1855; HASELTINE, 1871; SOUL (M. A.), 1869; WISE (W. L.), 1893.

PATENTS LAW—*continued.*

Patents. Law of Patents and Registration of Invention and Design in Manufacture, with Statutes, etc. TURNER (T.), 1851.

Patent Laws of the World. CARPMAEL (A. and E.), 1885.

Patents, Designs, and Trade Marks Act, 1883.
BOUSFIELD, 1884; PARLIAMENTARY..Papers, p. 495.
Analysis. NEWTON (A. V.), 1883.

Patents, Designs, and Trade Marks Acts, 1883 to 1888. EDMUNDS.

Patents, Designs, and Trade Marks Act, 1888. Register of Patent Agents' Rules, 1889. PARLIAMENTARY..Papers, p 495.

Patents, trade marks, etc., and digest of colonial and foreign Patent Laws. FULTON (D.), 1894. Add. 501.

Report on the Law relative to Patents, 1829.
PARLIAMENTARY..Papers, p. 495.

Some suggestions for a good Patent Law.
WISE (W. L.), 1893. Add. 539.

Summary of Law of Patents. WORDSWORTH (C. F. F.), 1853.

United States. MUNN and Co., 1870.

—— Patents and Patent Office. Patent Law, etc.
UNITED States, p. 355.

—— Engravings for report of the Commissioner of Patents for 1855. GRITZNER.

Victoria. Abstracts of Specifications of Patents applied for, 1854–66, and Patents and Patentees from 1854–75.
VICTORIA, p. 377.

Vienna. International Patent Congress, 1873. GROTHE, 1875.

PATENTS (SPECIFICATIONS, ABRIDGMENTS OF).
See COMMISSIONERS.

Aeronautics, p. 279.

Agriculture, p. 279.

Anchors, p. 279.

Artists' instruments and materials, p. 279.

Beverages (Unfermented). Mineral Waters, etc., p. 282.

Bleaching, dyeing and printing calico, etc., p. 279.

Books, portfolios, card cases, etc., p. 279.

Brewing, wine-making and distilling, p. 279.

Bricks and tiles, p. 279.

Bridges, viaducts and aqueducts, p. 279.

Brushing and sweeping, p. 279.

Carriages and other vehicles, p. 279.

Casks and barrels, p. 279.

Chains, chain cables, etc., p. 279.

Chemistry, acids, alkalies and oxides, p. 279.

Cooking, bread-making, p. 279.

PATENTS (Specifications, Abridgments of)—*continued.*

Cork, p. 279.
Drain tiles and pipes, p. 279.
Drains and sewers, p. 279.
Dressing and finishing woven fabrics, p. 280.
Electricity and magnetism, p. 280.
Engines, air, gas, and other motive power, p. 280.
Farriery, p. 280.
Fire-engines, p. 280.
Firearms, p. 280.
Flour, grinding grain and dressing flour and meal, p. 280.
Food, preservation of, p. 280.
Fuel, preparation and combustion of, p. 280.
Furniture and upholstery, p. 280.
Gas, p. 280.
Harbours, docks, canals, etc., p. 280.
Hinges, hinge-joints and door springs, p. 280.
Hydraulics, p. 280.
Ice-making machines, p. 280.
India-rubber and gutta-percha, p. 280.
Instruments, optical, mathematical, etc., p. 280.
Iron and steel, p. 280.
Lace, lace-making, pp. 280, 281.
Lamps, candlesticks, etc., p. 281.
Leather (Artificial), p. 279.
Locks, latches, etc., p. 281.
Locomotion, Aids to, p. 281.
Manure, p. 281.
Medicine, surgery and dentistry, p. 281.
Metals, p. 281.
Milking, churning and cheese-making, p. 281.
Mining, quarrying, etc., p. 281.
Music and musical instruments, p. 281.
Nails, rivets, bolts, etc., p. 281.
Needles and pins, p. 281.
Oils, fats, etc., p. 281.
Paints, colours and varnishes, p. 281.
Paper, p. 281.
Photography, p. 281.
Pipes and tubes, p. 281.
Pottery, p. 281.
Printing, p. 282; Letterpress printing, p. 281.
Propulsion (Marine), p. 281.

PATENTS (SPECIFICATIONS, ABRIDGMENTS OF)—*continued.*
Railways, Carriages, Signals, etc., p. 282.
Raising, lowering and weighing, p. 282.
Roads and Ways, p. 282.
Saddlery, p. 282.
Safes, strong rooms, etc., p. 282.
Sewing and embroidery, p. 282.
Ship building, p. 282.
Ships masts, sails, rigging, p. 281.
—— Steering and manœuvring vessels, p. 282.
Skins, hides and leathers, p. 282.
Spinning, p. 282.
Starch, gum, size, glue, p. 282.
Steam culture, p. 282.
Steam engine, p. 282.
Sugar, p. 282.
Tea, coffee, chicory, chocolate, cocoa, p. 282.
Tobacco, p. 282.
Toys, games, p. 282.
Trunks, portmanteaus, etc., p. 282.
Umbrellas, parasols, etc., p. 282.
Ventilation, p. 283.
Washing and wringing machines, p. 283.
Watches, clocks, p. 283.
Water, purifying and filtering, p. 282
Water closets, etc., p. 283.
Wearing apparel, p. 283.
Weaving, p. 283.
Writing Instruments, p. 283.

Bases of Patents, Specifications as.
SPENCE (William), 1870, '75, '84.
Language of Specifications of Letters Patents for Inventions.
MACGREGOR (J.), 1856.
List of Printed Specifications. COMMISSIONERS, p. 284.
Pattern Making and Moulding. MULLIN, 1885.
Treatise on the principles relating to Specifications.
SPENCE (William), 1847.

PAVEMENTS.
Advantages of smooth and impermeable Street surfaces.
CHADWICK (Sir E.), 1871, p. 235.
Carriage-way Pavements, construction of. DONKIN (B.), 1824.
—— Plans for improvement of Carriage pavements.
MACERONE, 1833.

PAVEMENTS—*continued.*

City Streets, Pavements for. GREELEY, 1881.
Construction and maintenance. LOVE (E. G.), 1890.
Different systems contrasted with that of David Stead the original patentee. BLACKIE (A. B.), 1842.
Private Streets Paving. Law and practice. SPINKS (W.), 1887, 1892.
Street Pavements. DAWSON (C. J. C.), 1876; HAUPT (L. M.), 1889.

Asphalt, use of. ELLICE-CLARK, 1879; DELANO, 1893.
—— Asphalt for foot pavements. BAZALGETTE (Sir J. W.), 1871.
—— Asphalt and Concrete Foot Pavements. STRACHAN (G. R.), 1887.
—— Rock Asphalt for Roads. MONTROTIER Asphalte, 1871.
Iron for roads of the future. PIMM, 1888.
—— for construction of "Cycle Ways" for vehicles on Highways, Roads, etc. PIMM, 1887.
—— Iron Paving Blocks. PIMM, 1889.
Macadam (Tar) and Concrete Macadam Pavement for Roadways. MCKIE, 1883.
Mosaic Pavements. Species of pavement formed of right-angled triangles of different colours. LARKIN (N. J.), 1818.
Wood and Asphalt Pavement for streets in cities and towns. NEVILLE (P.), 1886.
—— Advantages arising from the use of Patent Wooden Block Pavement. ANONYMOUS, 1839, p. 55.
—— Use of the Western Australia Woods, karri and jarrah. NORRINGTON, 1893.
—— Creosoting Wood Paving Sets. GRIFFITH (J. P.), 1890.
—— Patent Ligno-Mineral Paving Company. Mineralized Wood Pavement, 1874. PATENT LIGNO.
—— Wood Pavement, origin and progress. BLACKIE (A. B.), 1843.
—— New system of Wood Paving. ANONYMOUS, 1842, p. 51.
—— Stone, Wood, and Asphalt. BARABANT, 1884; LAW and Clark, 1877.
Birmingham Paving and Street Improvement Sub-Committee. Report of the Borough Surveyor. TILL (W. S.), 1874.
Calais. Manufacture of paving stones in the Pas de Calais, and the cultivation of that Industry. L'EVEILLÉ (P.), 1843. Add. 515.
Florence. RADDI, 1894.
Kensington, Chelsea, etc., Wood Pavement. ALLNUTT (H.), 1880.
London. Accidents to Horses. HAYWOOD (W.), 1873, p. 32.

PAVEMENTS—*continued.*

London. Answers to questions sent by Metropolitan Sanitary Commission. HAYWOOD (W.), 1848, p. 31.
—— Defective State of the Pavements. DEYKES, 1824.
—— Duties of Inspectors. HAYWOOD (W.), 1857, p. 31.
—— Improved Street Paving. PRACTICAL and Sci. Assoc., 1843–45.
—— Letters on the Pavement of the Metropolis and the adjoining turnpike roads, 1817. LONDON, p. 269.
—— Moorgate Street. HAYWOOD (W.), 1857, p. 31.
—— Observations on Metropolis Street Paving. TAYLOR (William), 1850.
—— Report on the Pavements in use. TOMKINS (H. T.), 1872.
—— Asphalt. HAYWOOD (W.), 1872, '73, p. 32.
—— Reports of J. W. Bazalgette and W. Haywood on the use of Asphalt for paving purposes, 1871. LONDON, p. 269.
—— Report on the inflammability of Asphalt Pavement, 1872. LONDON, p. 269.
—— Report respecting Val de Travers Asphalt Roadway, 1870. LONDON, p. 269.
—— Val de Travers Compressed Asphalt. HAYWOOD (W.), 1870, p. 32.
—— Asphalt and Wood. HAYWOOD (W.), 1874, '77, p. 32.
—— Asphalt, Wood, and Granite. Annual cost. HAYWOOD (W.), 1882, p. 32.
—— Granite and Asphalt. HAYWOOD (W.), 1871, p. 32.
—— Granite and Wood. Comparative durabilities. HAYWOOD (W.), 1853, p. 31.
—— Cast Iron Paving. HAYWOOD (W.), 1855, p. 31.
—— Macadamized London and Paris. DARCY, 1850.
—— Report on Wood Pavements. LONDON, p. 270.
—— Wood paving in London. STEVENS (J. L.), 1842.
Milan. Wood Pavements. SORMANI, 1883.
Montreal. Report on permanent Roadway Pavements. ANSLEY (G. D.), 1882.
New York. Contracts, etc., for Macadamized Pavement, 1878. NEW YORK CITY.
Provinces, Wood Paving for the. STEVENS (J. L.), 1842.
Rochdale. Paving Stones used at. PLATT (S. S.), 1891.
St. Louis. Contracts, specifications, etc., for macadamised paving. ST. LOUIS, 1878.
Sydney. Road Pavements in. MOUNTAIN, 1884.
—— Wood Paving and cube-sett paving. Contract Specification. 1891. SYDNEY, p. 272.
United States, Brick Pavements in. RUTTAN (H. N.), 1892.
Walham Green Pavements (Wood). Main route from Walham Green to Hammersmith. FULHAM Vestry, 1890.

See also ROADS; STREETS.

PEAT. Bosc (T.), 1870; Früh, 1883.
Age of Peat in the Valley of the Seine. Belgrand, 1869.
Essay on Peat. Walker (Dr. John), 1803.
Fertilizer and Fuel, uses of Peat as. Johnson (S. W.), 1866.
Fuel, Peat as an article of. Leavitt (T. H.), 1867.
—— Irish Amelioration Society for preparing Peat-fuel and Peat Charcoal. Rogers (J. W.), 1847.
—— Report of H.M.'s Consuls in the United States, 1874. Parliamentary..Papers, p. 495.
Peat as a substitute for Coal. Richardson (Ralph), 1873.
Peat Moss, Natural History and Origin of. Rennie (Rev. R.), 1807.
—— Peat Moss, or Turf Bog. Natural and agricultural history. Steele (A.), 1826.
—— Use of Peat Moss. Value of peat charcoal as a disinfector and fertilizer. Rogers (J. W.), 1849.
Peat Question, Review of the. Meadows, 1873.

PENDULUMS. Dent (E. J.), 1838. App. 554; Fordyce (G.), 1793. App. 557; Fordyce, 1794; Kessels, 1840. App. 564; Lubbock (Sir J. W.), 1830. App. 566.
Ballistic Pendulum, of more than 7400 lbs. weight, recently constructed in the Royal Arsenal, Woolwich. Gregory (O.), 1817. App. 559.
Correction of a pendulum for the reduction to a vacuum. Baily, 1832. App. 546.
Correction requisite to be applied to the length of. Airy (Sir G. B.), 1829. App. 543. Airy (Sir G. B.), 1830, p. 18.
Disturbances of Pendulums and Balances, and on the theory of Escapements. Airy (Sir G. B.), 1826. App. 543.
Earth, density of the, considered with regard to the reduction of Experiments on the Pendulum. Young (Thomas), 1819. App. 581.
—— Attempts to determine the ellipticity of the globe by Pendulum Observations. Bakewell (F. C.), 1853.
—— Experiments to determine the Earth's Figure by means of the pendulum vibrating seconds in different latitudes. Sabine (Sir E.), 1825. App. 575.
—— Pendulum Experiments made by Foster, in his scientific voyage in 1824–31, with a view to determine the figure of the Earth. Baily. App. 546.
—— Figure of the Earth determined by observation made at the polar circle. Maupertuis (P. L. M. de), 1738. App. 568.
—— Figure of the Earth determined by the pendulum. Sabine (Sir E.), 1825.
Experiments. Bunt, 1851.
Experiments about the motion of Pendulums in Vacuo. Derham (W.), 1764. App. 554.

PENDULUMS—*continued.*

Experiments to determine the azimuthal motion of the plane of vibration of a freely suspended pendulum.
GALBRAITH and Haughton, 1851.

Experiments to determine the Acceleration of the Pendulum in different Latitudes. SABINE (Sir E.), 1821. App. 575.

Foucault's Pendulum Experiment. Remarks.
TALBOT (H. F.), 1851.

Geognostic Pendulum. Theory of the pendulum experiment.
CONDER, 1851.

Invariable Pendulum. Account of Experiments made with.
FOSTER (Commander H.), 1826. App. 557. HALL (B.), 1823. App. 560.

Kater's invariable Pendulums. Account of experiments made in London and at the Cape with one.
BAILY, 1840. App. 546.

Manner of placing and directing pendulums.
ROBERT (H.), 185–. App. 574.

Means of constructing a pendulum unaffected by heat or cold.
CASSINI (J.), 1741. App. 551.

Mercurial Compensation Pendulum. BAILY, 1824. App. 546.

Movement of a pendulum in a resisting medium. COTES, 1770. App. 552; HUYGHENS, 1673. App. 562; PLANA (J.), 1835. App. 572. POISSON (S. D.), 1830. App. 572.

Oscillations of the pendulum, influence of the suspension spring on the continuation of the.
LAUGIER (P. A. E.), 1845. App. 565.

Perpetual pendulum with a new balance.
HAUTEFEUILLE (J. d'), 1678. App. 561.

Raingo's pendulums. Report and description.
FRANCOEUR (L. B.), 1822. App. 557. RAINGO, 1823; RAINGO, 1825. App. 572.

Regulating (art of) pendulums. BERTHOUD (F.), 1759 and 1811. App. 547.

—— Pendulums, how to regulate them, etc.
ROBERT (H.), 1841, '49. App. 574.

Seconds pendulum, length of.
LAPLACE (P. S. de), 1820 App. 565.

—— True means of perfecting the pendulum vibrating seconds.
RIDEREAU, 1770. App. 573.

Vibrating between cheeks, pendulums.
GOMPERTZ (B.), 1817. App. 559.

Vibration of a free pendulum in an oval differing little from a straight line. AIRY (Sir G. B.), 1851, p. 22.

Vibrations of Pendulums with different suspending springs. Results of Experiments on. FRODSHAM (W. J.), 1838, p. 558.

—— Reduction to a Vacuum of the Vibrations of an invariable Pendulum. SABINE (Sir E.), 1829. App. 575.

PENDULUMS—*continued.*

Cape of Good Hope Observatory. Observations made with the Invariable Pendulum at, for determining the compression of the Earth. FALLOWS (Rev. F.), 1830. App. 556.

Great Britain, Trigonometrical Survey of, principal stations. Account of Experiments for determining the variation of the Length of the Pendulum vibrating seconds at. KATER (Capt. H.), 1819. App. 564.

Greenwich Observatory. Experiments on the length of the Seconds Pendulum at. SABINE (Sir E.), 1831. App. 575.

—— Experiments to determine the difference in the number of vibrations made by an invariable pendulum in Greenwich Observatory and Kater's house in London. SABINE (Sir E.), 1828. App. 575.

Harton Colliery. Pendulum Experiments made at. AIRY (Sir G. B.) 1855, pp. 17, 21.

London. Experiments relating to the Pendulum vibrating Seconds of Time in the latitude of London. KATER (Capt. H.), 1818. App. 664. PARLIAMENTARY..Papers, 1818. App. 571.

—— Two pendulums of the Royal Society and one of Kater's invariable pendulums. Experiments in London and at two stations on the Euphrates made with. BAILY, 1840. App. 546.

—— London and Black River in Jamaica. Account of Observations made in, concerning the going of a clock; in order to determine the difference between the length of isochronal pendulums in those places. BRADLEY (J.), 1734. App. 550.

—— London and Paris, difference in the length of the Seconds Pendulum in. Experiments to determine. SABINE (Sir E.), 1827. App. 575.

New South Wales. Account of Experiments made with an Invariable Pendulum at, by Sir T. Brisbane. KATER (Capt. H.), 1823. App. 564.

Paramatta. Length of the Pendulum vibrating seconds at, according to Borda's method. Observations for determining. RUMKER (C.), 1828. App. 575.

Paris. Experiments on the length of a seconds pendulum at. MAIRAN (J. J. D. de), 1735. App. 567.

Properties of Weights suspended by Cords (Borelli). VARIGNON (P.), 1637. App. 579.

St. Domingo. Measure of pendulum at. LA CONDAMINE (C. M. de), 1735. App. 565.

See also GRAVITATION.

PENS. BEVAN (G. P.), Industries, vol. 3.

PENSIONS (GOVERNMENT). Literature and the Pension List. COLLES, 1889.

PERCUSSION. Force of Percussion. WOLLASTON (W. H.), 1806.

PERIODICALS.

English and Foreign Periodicals.
PERIODICAL Publications..pp. 8–27.

Index to foreign scientific, in the Patent Office Library.
COMMISSIONERS, p. 284.

Periodical Literature. Index. POOLE and FLETCHER, 1882–93.

Repertorium der technischen Journal Literatur, 1854, etc.
KERL (B.), 1871, etc.

PERMANENT WAY. COUCHE, 1867, 1877; HALES (W. P.), 1889; HOHENEGGER, 1886; MARTIN (Jules), 1890; RZIHA, 1876–77; SCHWEDLER, 1891; WEBER (M. M. von), 1869; WINKLER (E.), 1875.

Construction and duration. ADAMS (W. B.), 1854.

Examples of Iron Permanent Way for main lines, light railways and street tramways. LIVESEY, 1875.

Harvey and Roe's Permanent Way. HARVEY, T. F., and Roe 1877.

Hilf's system of wrought iron Permanent Way for Railways.
SIMON (H.), 1877.

Improvements. BERGERON (C.), 1882.

Iron and Steel used as railway plant. Effect of cold on them.
SANDBERG (C. P.), 1870.

Iron permanent way, Pressel system. PRESSEL (W.), 1886.

Langley and Prince's method of working and bolt-locking points or switches by one lever. LANGLEY and Prince, 1891.

Maintenance expenses of Track on Wooden and Metal Ties.
POST (J. W.), 1888.

Mallet's patent Iron Buckled Plate Elastic Permanent Way.
MALLET (R.), 1868.

Material of economic railways. POST (J. W.), 1883.

New mode of constructing the Permanent Way of railways.
REYNOLDS (J.), 1836.

Patent Permanent Way. BERGUE, 1880.

Railway track. HAARMANN, 1891.

Reform of Permanent Way. BERGERON (C.), 1883.

Reforms in laying and maintenance. BERGERON (C.), 1880.

Requisites of Smooth Track. NOONAN, 1893.

Safety of Permanent Way. SANDBERG (C. P.), 1874.

Specification of an Invention of Improvements.
SMYTHE (A. J. H.), 1881.

Track: a manual of maintenance of way. PARSONS (W. B.), 1886.

Europe. COLBURN and Holley, 1858.

Italy. Projected railway from Milan to Como. MILAN, 1837.

Midland Railway Wrought Iron Permanent Way.
BARLOW (W. H.), 1850.

PERMANENT WAY—*continued.*

New South Wales, 1889. NEW SOUTH WALES, p. 403.
Prussian State Railways. Various systems. GRÜTTEFIEN, 1880.
Rhenish Railway. HOFFMANN, 1880.
South Eastern Railway Permanent Way.
BARLOW (P. W.), 1870; POPE (John), 1842.

PERMANENT WAY (CHAIRS).

Cowper's method of casting Railway chairs. COWPER.
"Lock Grip" Patent Railway chair. MORRIS (F. S.).
Method of confining India-rubber or other elastic bearings.
DAVIS (D. L.), 1856.
Newly invented railway chair. WHITE (James), 1837.

PERMANENT WAY (CROSSINGS). Formulas for ascertaining the angles of Crossings. DONALDSON (W.), 1871.
Iron gates for railway level crossings. Simultaneous-acting.
YOUNG (C. D.), 1850.
Material, platelaying, and points and crossings.
COLE (W. H.), 1890.
Platelayers' Guide. Table for cutting in permanent way fittings.
LEAN, 1872.
Platelaying, maintenance, points and crossings.
COLE (W. H.), 1885.
Returns by railway companies. Crossings, 1873.
PARLIAMENTARY..Papers, 502.
Switches and Crossings. JONES (J. A.), 1881.
Tables of Switches and Crossings, 1886. PATERSON (J.)
Tables for Platelayers. DONALDSON (W.), 1871.

PERMANENT WAY (GAUGES).

Gauges of a metre and of 60 centimetres.
ROGIER, 1873. Add. 531.
Narrow and wide. MOSCHELL, 1874.
Narrow. Lausanne to Echallens. MOSCHELL, 1880.

PERMANENT WAY (RAILS).

Barlow's Reports on Iron Rails. Examination of. LECOUNT, 1836.
Comparative merits of iron and steel rails. FLINT, 1868.
Creep of Rails on Double Lines of Railway. STONEY (E. W.), 1892.
Dublin and Drogheda Railway. Rails, Sleepers and Fastenings.
HEMANS, 1846.
Durable joint. ZIMMERMANN, 1892.
Fish-plates of rails. SANDBERG, 1886; ZIMMERMANN, 1887.
Form and manufacture of Iron rails. Bertrand *v.* Harford.
BARNARD, 1838.
Germany. Duration of rails. KIEPENHEUER, 1879.

PERMANENT WAY (Rails)—*continued.*

Heavy rails. Their employment for security and economy.
Sandberg (C. P.), 1889.

Improvements in laying rails, chairs and sleepers. Brant, 1855.

Iron rails. Their strength at different temperatures.
Sandberg (C. P.), 1869.

Joints of rails. Grandis, 1859.

New safety rail for railways. Hopkins (J.), 1846.

New York Central and Hudson River Railway. Standard Specifications for Steel Rails.
New York Central Rly., 1893. Add. 523.

Patent single, double and triple-headed rails.
Addis (W. J.), 1868.

Prevention of derailment. Maurize, 1868.

Queensland Steel Rail Contracts. Hamilton (T.), 1882.

Rail-joints. Caillé (J.), 1887.

Rail Specifications and rail inspection in Europe.
Sandberg (C. P.), 1880.

Seaton's Patent Safety Rail and improvements in the Permanent Way. Seaton (W.), 1882.

Standard Rail Sections and Fish Bar Joints.
Jones (W. R.), 1883.

Standard Rail Sections, Final Report.
American Society of Civil Engineers, 1893.

Standard sections. Gaerth, 1872.

Steel rails, considered chemically and mechanically.
Sandberg (C. P.), 1890.

—— Bessemer. Determination of quality of. Tetmajer, 1884.

—— Their duration. Sandberg (C. P.). 1886.

—— Wearing qualities of American.
American Iron and Steel Association.

Steel rails with improved rail joints. Sandberg (C. P.), 1878.

Stevens' patent Fastenings for securing Rails to chairs and connecting Rails. Stevens (Frederick W.), 1885.

Transverse strength of a Railway Rail. Clarke (H. W.), 1890.

Why do the rail-joints and splice-bars break?
Becker (M. J.), 1885.

PERMANENT WAY (Sleepers). Maurize, 1868.

Cast Iron Sleepers. Experiments on. Permanent Way Co., 1857.

—— Breaking experiments. Mills (W. H.), 1857.

Comparison of wood and iron. Demoly, 1880, '82.

Elastic metal Railway sleepers in combination with chairs.
Ker, 1890.

Exhibition of sleepers and permanent way for railways and tramways. Société Belge des Ingénieurs, etc., 1886.

PERMANENT WAY (Sleepers)—*continued.*
Hilf's wrought-iron longitudinal continuous sleepers. Hilf, 1876, '77.
Improvements in metal longitudinal sleepers. Holtham, 1884.
Madras Railway. Woods used for Sleepers on. McMaster (B.), 1863. Add. 517.
Metallic sleepers. Anonymous, 1886, p. 58.
South Australia. Sleepers replaced on Southern Railways. South Australia, 1873, p. 228.
Species of wood employed for sleepers. Coisne (C.), 1871. Add. 492.
Timber Sleepers. Economic Permanent Way Company's new Railway systems of, 1869. Griffin (G. F.), 1869.

PERPETUAL MOTION. Gardner (J. C.), 1867.
Certain Conditions under which Perpetual Motion is possible. Airy (Sir G. B.), 1830, p. 19; Airy (Sir G. B.), 1829. App. 543.
Essay for a machine of Perpetual Motion. Stewart (R.), 1709.
Ideas on Perpetual motion. Anonymous, 1813. App. 544.

PERSPECTIVE. Clarke (G. S.), 1884; Rittinger, 1839.
Arithmetical Perspective. Bernard, 1839.
Artists, for the use of. Cloquet, 1823.
History and present state. Priestley, 1769.
Isometrical Perspective. Jopling, 1833.
Lineal and aerial Perspective. Fielding (T. H.), 1836.
Linear Perspective. Treatise. La Gournerie, 1859.
—— Application to the architectural decoration of Ceilings. Bailby, 1876.
New method of teaching perspective. Schendel, 1861.
Principles of the Art. Lawrence, 1838.
Rudimentary and practical treatise. Pyne, 1867.
Rudiments of Practical Perspective. Nicholson (P.), 1822.
Rules and Examples. Pozzo, 1703.
Theory and practice. Priestley, 1770.
Treatise upon Perspective. Anonymous, 1836, p. 42.

PETROLEUM. Crew, 1887; Gesner, 1865; Rey (A.), 1865.
Applications. Deutsch, 1891.
Coal-oil and Petroleum. Erni, 1865.
Derivatives, Petroleum and its. History, Origin, and Composition. Tate (A. N.), 1864.
Experiments at Woolwich Dockyard on Petroleum and Shale Oil, 1866. Parliamentary..Papers, p. 495.
Fiery Fountain of St. Barthélemy. Piret, 1881.
Flashing test. Abel (Sir F. A.), 1883.

PETROLEUM—*continued.*

Fuel, Petroleum as. Report of Petroleum Light Company. ADAMS (J. W.), 1865.

Heating steam boilers, use for. BODELE, 1865.

Illuminant, Petroleum as an. CHANDLER, 1871.

Petroleum and Petroleum Wells. BONE, 1865.

Places of origin. HUE, 1887.

Producer of Energy, Petroleum as a. HARRIS (H. G.), 1891.

Production and Use. PECKHAM (S. F.), 1884.

Products, Petroleum and its. Cantor lectures. REDWOOD, 1886.

Reports of Select Committee, 1872, '94. PARLIAMENTARY..Papers, p. 495. PARLIAMENTARY..Papers. Add. 526.

Transport of Petroleum in bulk. FLANNERY, 1893.

"United," destruction of Petroleum laden vessel in Bristol docks, 1888. BRISTOL.

America (North). Standard Oil Company. Petroleum Industry America. WELCH (J. C.), 1883.

—— Petroleum Industry. HÖFER, 1877.

Austrian and German Petroleum Industry. STRIPPELMANN (L.), 1878–9.

Europe (Eastern), Petroleum in. EASTLAKE (A. W.), 1892.

Galicia. Petroleum and Ozokerite industries. REDWOOD, 1892.

—— Boring for Petroleum in Galicia, Austria, etc. BOYD (R. N.), 1889.

Germany. DÜCKER, 1881.

Italy. Petroleum zones of Italy. FAIRMAN, 1868.

New York, etc. Prospects of Petroleum in New York, Pennsylvania, Ohio, West Virginia, etc. ANONYMOUS, 1855, p. 43.

Ohio, Geological Survey of. Report on Petroleum and Inflammable Gas. ORTON, 1887.

Pennsylvania petroleum region. CONE and Johns, 1870.

—— Oil Regions showing where petroleum is found, etc. WRIGHT (W.), 1865.

—— Petroleum, its production, transportation, manufacture and statistics. WRIGLEY (H. E.), 1875.

—— Venango County, oil region of. EATON (S. J. M.), 1866.

Pennsylvania (Western). History. HENRY (J. T.), 1873.

Russian Petroleum and its bearing on British Trade. MARVIN, 1886.

—— Petroleum Region of the Caspian in 1883. MARVIN.

Tank-car rolling stock for the Transport of Petroleum in Russia. RUSSIA.

Trinidad. Bitumen and Petroleum. DUNDONALD, 1857.

PHARMACY. Phosphate of Soda as a purgative. Pearson (G.), 1788.

PHILOLOGY. *See* Languages.

PHILOSOPHY. Principles. Descartes, 1656.

PHLORIDZINE. Properties and analysis. Koninck, 1836.

PHONOGRAPH. Anonymous, 1883, p. 40; Niaudet, 1878.
An account of the Phonograph. Tegg (W.), 1878.

PHONOLOGY. Vowel Sounds and Reed Organ-pipes. Willis (R.), 1829. App. 581.

PHOSPHATE. Florida Phosphates. Watteyne (V.), 1892.

PHOTOGRAPHY. Bevan (G. P.). Industries, vol. 8; Photographic Society.
Action of the Rays of the Solar Spectrum on the Daguerreotype plate. Herschel (Sir J. F. W.), 1843.
—— On vegetable Colours. Herschel (Sir J. F. W.), 1842.
—— On certain Compounds of Silver. Herschel (Sir J. F. W.), 1859.
Application of Photography to the production of printing surfaces and pictures in pigment. Bolas, 1878.
Chemical action of the Rays of the Solar Spectrum on preparations of silver, etc. Herschel (Sir J. F. W.), 1840.
Instantaneous Photography. Herschel (Sir J. F. W.), 1860.
Instruction in Photography. Abney, 1871.
Lectures. Abney, 1878, 1885.
Meteorological work. Photography in relation to. Whipple (G. M.), 1890.
Photographic Club recollections. Sellers (C.), 1888.
Photographic Processes (Improvements on). Herschel (Sir J. F. W.), 1843.
Photographs of early date. Boulton (M. P. W.), 1865.
Photography applied to Surveying. Reed (H. A.), 1888.
—— From Balloons. Tissandier (G.), 1886.
Recent advances in Photography. Lectures. Abney, 1882.

PHOTOMETER. Theory of the Jet-photometer and duration test. Kirkham, 1869.

PHOTOMETRY. Brown (J. T.), 1883; Dibdin, 1885.
Tables. Vidal, 1884.

PHOTOPHONE. Action of selenium. Jamieson (Andrew), 1881.

PHOTO-ZINCOGRAPHY. James (Sir H.), 1860.

PHYSICS. CHAMBERS (W. and R.), 1854–56; GARIEL, 1888; PHYSICAL SOCIETY; THOMSON (Sir W.), and Tait, 1867, '79, '83, '85.

Analysis of a course of lectures in natural and experimental philosophy. WALKER (A.), 1802. App. 580.

Annalen der Physik u. Chemie. PERIODICAL PUBLICATIONS, p. 9.

Annales de Chemie et de Physique. PERIODICAL PUBLICATIONS, p. 9.

Archimedes. Theorems selected out of, and demonstrated in an easy way, and some other propositions added. TACQUET (A.), 1714. App. 578.

Atomic Weights. Discovery of the Periodic Law and on Relations among the. NEWLANDS, 1884.

Belgium, Physical science in. QUETELET, 1864.

Camphor on Water, its motions. Motion of Camphor to Light and History of the modern theory of Dew. TOMLINSON (C.), 1863.

Capillary Attraction. THOMSON (Sir William), 1886; WEBSTER (Thomas), Q.C., 1838.

Committee of physics. Report on. ROYAL SOCIETY, 1840.

Cosmos, physical description of the Universe. HUMBOLDT, 1851–60.

Density of the earth. Probability of Error in Physical observations. YOUNG (Dr. T.), 1819; YOUNG (Thomas), 1819. App. 581.

École Polytechnique, Courses at the. JAMIN, 1858, '82; LAMÉ, 1840.

Elective Attractions. Numerical table of, with remarks on the sequences of double decompositions. YOUNG (Dr. T.), 1809.

Elementary Physics. ARNOTT (N.) 1828, 1829, 1864–65; BIOT, 1816, 1817; BIRD (G.), 1839; BOYLE (Hon. R.), 1664; DESAQULIERS, 1734, 1763; DESCHANEL, 1870–72. Treatises, GANOT, 1863, 1883; GUGLIELMINI, 1719; HAUY, 1807. App. 561; HAUY, 1821; HOPKINS (G. M.), 1890; LESLIE (Sir John), 1823; MAXWELL, 1871; PECLET (É.), 1832; PESCHEL (C. F.), 1845–6; POUILLET, 1840; PRIESTLEY, 1779–86; STEWART (Balfour), 1873; STEWART (Balfour), and Gee, 1885–87; TOMLINSON (C.), 1859; WEBSTER (Thomas), Q.C., 1837; WEINHOLD (A. F.), 1875.

Elementary Substances. Their origin and some new relations of their atomic weights. WILDE (H.), 1892.

Experimental philosophy. WÜLLNER, 1882–86. Address to the students of Guy's Hospital. ALLEN (W.), 1826.

Fluids, Cohesion of. YOUNG (Dr. T.), 1805.

—— Employment of percussion in the theory of the movement of a solid in a fluid. WILLOTTE (H.), 1892.

Experimental enquiries concerning the principle of Lateral Communication of Motion in Fluids. VENTURI (J. B.), 1799. App. 579.

PHYSICS—*continued.*

Experimental Philosophy. Heads of Lectures. PRIESTLEY, 1794.
Forces of Matter. FARADAY (M.), 1861.
—— Law of Force and Motion. HARRIS (John), 1890.
—— Forces of Nature. GUILLEMIN (A.), 1872. Applications of Physical Forces. GUILLEMIN, 1877.
—— Force and Nature. Attraction and Repulsion: the principles of energy. WINSLOW (C. F.), 1869.
Fortschritte der Physik. PERIODICAL PUBLICATIONS, p. 15.
Globe, physics of the. BOCCARDO, 1868.
Industrial Physics. DWELSHAUVERS-DERY, 1876.
Journal de physique théorique et appliquée. PERIODICAL PUBLICATIONS, p. 17.
Lectures at Oxford, 1700. KEILL (J.), 1758. App. 564.
Letters. EULER, 1802.
Manual of Natural and Experimental Philosophy. PARTINGTON, 1828.
Mathematical Elements of Natural Philosophy. GRAVESANDE, 1747.
Mathematical Magick: or the wonders that may be performed by Mechanical Geometry. WILKINS (J.), 1691.
Mathematical Physics. RÉSAL (H.), 1884.
Mathematical principles of natural philosophy. BRIDGE, 1813.
Matter. Constitution of. THOMSON (Sir William), 1889–94.
—— Origin of, and its mental government. LAMING, 1870.
—— Universal principle of the movement of. TRÉMAUX (P.), 1874, '76.
Mechanical and Natural Philosophy, Diagrams illustrative of the principles of. CHAPMAN (H.), 1842.
Mechanics, Hydrostatics, Hydraulics, Pneumatics, Optics, Geography, Astronomy and Dialing. Lectures. FERGUSON (J.), 1806. App. 557.
Modern Physics. The Concepts and Theories of, 1890. STALLO (J. B.).
Moving forces. Treatise on. CAMUS (F. J. de), 1722. App. 551.
Natural philosophy and the mechanical arts. YOUNG (Dr. T.), 1807, 1845.
Newton's Principia. NEWTON (Sir I.), 1726; 1871. Add. 523.
—— Analytical View of. BROUGHAM and Routh, 1855.
—— Historical Essay on its first publication. RIGAUD (S. P.), 1837. App. 573.
—— Commentary. WRIGHT (J. M. F.), 1833.
—— Principles of Newton's Theory of Vibrating Motion. Light and Fire. MARTIN (B.), 1746.
Outlines of Natural Philosophy. PLAYFAIR (J.), 1814–16.
Philosophical dissertations on mechanical powers, elastic bodies, falling bodies, the cycloid, the parabola, the rainbow, etc. MORGAN, 1770. App. 569.

PHYSICS—*continued.*

Physical Papers. STOKES (Sir G. G.), 1880, '83.
Physical Science. Studies. MILLAR (W. J.), 1878.
Physico-Mechanical Experiments. HAUKSBEE, 1709, '19.
Physics of the Earth. Familiar letters. BUFF, 1851.
Physics in Secondary Schools. SLATE (F.), 1892.
Prælectiones Physico-mathematicæ. WHISTON (W.), 1710.
Principles of Natural Philosophy. ATWOOD, 1784; MÜLLER (J.), 1847.
Recreations. OZANAM, 1803.
Repertorium der Physik. PERIODICAL PUBLICATIONS, p. 22.
Spheroidal state of matter. BOUTIGNY (P. H.), 1883.
Specific names for functions of simple elements. GILBERT (D.). 1827.
Study of Natural Philosophy. HERSCHEL (Sir J. F. W.), 1830; JORDAN (W. L.), 1883.
Tables. SCHUBARTH (E. L.), 1881.
Vacuum Tubes. Phenomena in. SALOMONS (Sir D. L.), 1894. Add 532.
Views of nature, sublime phenomena of Creation. HUMBOLDT, 1850.
Zürich Polytechnikum new buildings. BLUNTSCHLI and Lasius, 1887.

PHYSIOGRAPHY. Introduction to the Study of Nature. HUXLEY, 1879, '90.

PHYSIOLOGY. CHARPIGNON, 1848.
Animal and Vegetable Physiology, considered with reference to natural theology. BRIDGEWATER Treatises, 5; ROGET (P. M.), 1834.
Apparatus for Physiological Investigation. BURDON-Sanderson, 1879.
Blood, Motion of the. YOUNG (Dr. T.), 1808.
Chemistry (Physiological). CAVENDISH Society, 1851–54.
Electro-Physiology of Man. Modes of Galvanic Treatment. HUMPHREYS (J. D), 1843.
Essays. BOYLE (Hon. R.), 1661.
Eye, Mechanism of. YOUNG (Dr. T.), 1801.
Formation of Fat in the Human Body. LAWES (Sir J. B.), 1877.

PIERS.

Building of Piers and Locks. POETSCH, 1889.
Constructions (Pier) of recent date. LILJENCRANTZ, 1879.
—— Method of constructing Piers. REDFERN, 1852.
Iron Piers. WEBB (E. B.), 1862.
Piers of piles. CALAND (A.), 1819.
Australia (South). Kingston and Rivoli Bay Piers. Award. KINGSTON Bay, 1878.

PIERS—*continued.*

Australia (South). Kingston and Rivoli Bay Piers. Contracts for Construction. Arbitration, Wells Bros. *v.* Hon. the Treasurer. WELLS Brothers, 1878.

Ballycottin, co. Cork. Report. BALLYCOTTIN, 1889.

Blackpool South Shore Pier and Pavilion Company. Prospectus. BLACKPOOL, 1890.

Bombay Harbour Pier Scheme. WALKER (W.), 1857.

Bridlington Piers. Report on their state. SMEATON (J.), 1778.

Deal. Prospectus of Deal Pier Company. DEAL, 1837.

Folkestone. Promenade Pier and Pavilion. FOLKESTONE, 1887.

Galway and Mayo. GALWAY, 1889.

Gravesend. Town Quay and Pier adjoining. Bill, 1833. GRAVESEND.

Ireland. Report of Commission, 1887. IRELAND, p. 141.

Milton on Thames, Cast-iron Terrace. REDMAN (J. B.), 1845.

Ostend jetty promenade. COSSOUX, 1888.

Sunderland Harbour Pier. Report on Shout's plan for rebuilding and extending it. SMEATON (J.), 1780, p. 208.

Thames. Proposed Steamboat piers. REDMAN (J. B.), 1846.

Tyne Piers. Report on Cail's proposed scheme for constructing them. URE (J. F.) and Messent, 1877.

—— Specifications, Form of tender, Correspondence, etc., for the Construction of piers at or near the entrance. TYNE River, 1854 and 1855, p. 335 and 336.

—— Piers at entrance. Report. WALKER (James), 1853, p. 395.

—— Report on injury to and repair of Tyne Piers Works. URE (J. F.), and Messent, 1868.

—— Reports on the present condition, progress and plans, for the future work at the Tyne Piers. URE (J. F.), and Messent, 1877.

PILES AND PILE DRIVING.

BATERDEN (J. R.), 1894. Add. 484.

Bearing Piles, formulas for their sustaining power. HERING (R.), 1878.

Ground Screw and its application to Piles and Moorings. GIBSON (T.), 1882.

Gunpowder pile-driver (Shaw's). PRINDLE.

Locomotive steam double pile driving and railway grading machine. COWDIN, 1842.

Machines, pile driving. NURSEY, 1886.

Resistance of piles to superincumbent pressure. MASON (J. L.), 1850.

Timber Piling in foundations and other works. ADAMS (H.), 1891.

Uniform practice in pile-driving. CROWELL, 1892.

PILOTAGE. Jersey Law on Pilotage. JERSEY, 1846.

PIPES.

Cast-Iron Pipes. BENEDICT, 1878; HARLOW, 1884.

—— Advantages of Chameroy's system of wrought-iron pipes for gas, water and drainage, as compared with cast-iron pipes. FOX, Henderson and Co., 1849.

Corrosion of cast-iron pipes. MCELROY, 1883.

Delivery pipes. BOILEAU (P.), 1878, 1881.

Founding (Pipe). Practical notes on. MACFARLANE (J. W.), 1888.

Hydraulic Problems on the Cross-sections of Pipes and Channels. HENNESSY, 1888.

Joints of Pipes. Improved method of joining or securing them. RICHARDSON (Robert), 1854.

Maximum discharge through a pipe of Circular Section. HENNESSY, 1888.

Metal Pipes. Studies on the resistance of. VIRGILE (Col.), 1874.

Motion of Fluids in Pipes. ANONYMOUS, 1850, p. 51
POISSON, 1819; POLE, 1852.

Pipes for various pressures. Diagrams giving the proper weights and thicknesses. TAYLOR (E. B.), and G. M. Taylor, 1891.

Silicated stone pipes. BUTLER (J. W.), 1879.

PLANE SURFACE. Law of the progress of accuracy in the usual process for forming. AIRY (Sir G. B.), 1871, p. 17.

PLANIMETERS. *See* INTEGRATORS.

PLASTERING (PRACTICAL). ANONYMOUS, 1830, p. 52.

PLATEWAYS. HOLT (A.), 1883.

PLATINUM. FARADAY (M.), 1861.

PLOUGH. *See* AGRICULTURAL IMPLEMENTS.

PLUMBING.

Art or Craft of the Plumber. BUCHAN (W. P.), 1876.

Plumber and Sanitary Houses. HELLYER, 1884, '93.

Science and art of sanitary Plumbing. HELLYER, 1882.

Standard practical plumbing. DAVIES (F. J.), 1885.

PNEUMATIC DESPATCH. BEACH, 1868.

Conveyance of goods and passengers upon an iron road through a tube of 30 feet in area by the power and velocity of air. MEDHURST, 1812.

London. Application of the P. D. Company to lay a tube through Holborn, Skinner Street and Newgate Street. HAYWOOD (W.), 1863, p. 34.

PNEUMATIC DESPATCH—*continued.*

Method of conveying letters and goods with great certainty and rapidity by air. MEDHURST, 1810.

Pneumatic Propulsion. Railway from Lausanne to Ouchy. GAUDARD, 1869.

Pneumatic Transmission. Proposed method of. VALLANCE (J.), 1827.

Pneumatic Transmission through tunnels and Pipes. SABINE (R.), 1870.

Transmission of messages and parcels between Paris and London. BERLIER, 1885.

PNEUMATICS. FERGUSON (J.), 1799; MAGNUS, 1878; SAUVAGE (E.), 1894; LARDNER, 1831; TOMLINSON (C.), 1866.

Pneumatic Apparatus. WATT (James), 1795–6.

POISONS. Poisonous effects of certain dyes and colours used in domestic fabrics. CARR (H.), 1879, 1880.

POLE (NORTH). Thermal paths to. BENT (S.), 1872.

POLICE.

Construction of police stations. DU CANE, 1875.

Metropolitan and provincial police. CHADWICK (Sir E.), 1886, p. 235.

London. Police establishments. DUDLEY (S. B. W.), 1828.

—— Reports on the state of the police, 1816–28. LONDON, p. 262.

—— Report of Commissioner of Police for 1890. LONDON, p. 262.

Madras. Report on the administration, 1860. INDIA, p. 124.

—— Operations of the Police Force, 1859. INDIA, p. 124.

Salford. Police Superannuation Fund, Salford. CHADWICK (D.), 1858.

POLITICAL ECONOMY.

Analysis of principles of Economics. GEDDES, 1885.

Canadian Economics. BRITISH Association, 1885.

Monopolies. Competition *versus* Monopoly. WILLIAMS (E. L.), 1858.

Elementary thoughts. BASSETT (J. D.), 1819.

England's Improvement by Sea and Land. YARRANTON, 1677.

Great Britain and Ireland, population, production, revenues, and financial operations. MARSHALL (J.), 1833.

Manual. BAUDRILLART, 1883.

Wealth of Nations. SMITH (Adam), 1869.

POLYTECHNICS.

German Polytechnic Library. ANONYMOUS, 1868–78, p. 52.

Goldsmith's Technical and Recreative Institute. Prospectus. GOLDMANN, 1891.

Polytechnique (École), Paris. Journal, 1795, etc. Programmes, 1850, etc. PARIS, p. 455.

PONTOONS. France, 1878. FRANCE, p. 437.

POOR.

Industrious Poor, relief of. CHARITABLE Corporation, 1832–33.
Means for the extermination of Poverty. CACHEUX, 1876.
Pauperism, Prevention of. BLACKLEY, 1883.
Poor Law. Abstracts of returns from Overseers, 1876–77. PARLIAMENTARY..Papers, p. 496.
—— Reports on the State of the Poor and Charitable Donations, 1787, '88. PARLIAMENTARY..Papers, p. 496.
—— Report of Poor Law Commissioners on the training of Pauper Children, 1841. PARLIAMENTARY..Papers, p. 496.
—— Reports of the Poor Law Board, 1848–71. PARLIAMENTARY..Papers, p. 496.
—— Reports on Poor Relief and settlement, 1775. PARLIAMENTARY..Papers, p. 495.

Flanders, Pauperism in. DUCPETIAUX, 1850.
George (St.), Hanover Square. Poor Rates, 1835 (Principles of the Poor Law Amendment Act). LESLIE (John).
Ireland. Legal provision for the Irish Poor. DOYLE, 1831.
—— Provision for the poor population by the cultivation of the soil. ALLEN (W.), 1832.
London. State of the parish poor children in London and Middlesex, 1778. LONDON, p. 263.
Norfolk. Act for bettering the poor of Loddon and Clavering. LODDON, 1764.

POPULATION.

Essay on the Principle of Population. MALTHUS, 1817.

Alaska, Report on Population of PETROFF (I.), 1884.
Alsace, Census, 1873. ALSACE, 1874.
Alsace-Lorraine. Census of 1871. ALSACE, 1873.
Buenos Aires, 1881. BUENOS AYRES.
Cape Colony. Results of a Census 5 April, 1891. CAPE Colony, p. 220.
England and Wales, Statistical Papers based on Census of 1851. WELTON (T. A.), 1860.
—— Census 1861, 1871, 1881, 1891. PARLIAMENTARY..Papers, p. 496.
—— Digest of the English Census of 1871. LEWIS, 1873.
Glasgow and County of Lanark. CLELAND, 1831.
Great Britain. Abstracts of Returns 1801, 1811, 1821, 1831, 1841, 1851. PARLIAMENTARY..Papers, p. 496.
—— Census of Great Britain in 1851. CHESHIRE, 1853.

POPULATION—*continued.*

India. Population of Assam, 1855. INDIA, p. 109.
—— Census of British India, 1871–72. INDIA, p. 99.
Ireland. Censuses 1813, 1821, 1831, 1841, 1851, 1861, 1871, 1881, 1891. IRELAND, p. 142.
London 1801–81. PRICE WILLIAMS, 1885.
New South Wales Census, 1871. Education, &c. NEW SOUTH WALES, p. 400.
—— Statistician's Report on the Eleventh Census. NEW SOUTH WALES, 1893, p. 401.
—— General Report and Statistician's Report on the 11th census. NEW SOUTH WALES, 1894. Add. 522.
New York. Density, and evils resulting therefrom. DAVENPORT, 1884.
Scotland, Census for 1861, 1871, 1881, and 1891. SCOTLAND, 1862–4, 1872–4, 1882, 1893, page 175.
Spain. Rural Population. CABALLERO, 1863.
United States Census. UNITED States, 1872, 1883–88, p. 342.
United States Population. Report on the defective, dependent, and delinquent classes. WINES (F. H.), 1888.
Victoria. Census, Reports, Tables, etc. VICTORIA, 1880–84, p. 377.

PORTLAND CEMENT. *See* CEMENTS.

PORTRAITS. Catalogues of 2nd and 3rd Exhibitions of National Portraits, 1867–68. SOUTH Kensington Museum.
National Portrait Gallery. Catalogue. NATIONAL PORTRAIT GALLERY, 1859.

PORTS.

Charges (Port) and requirements on vessels in various ports of the World. HUNTER (T.) and Patten.
Commercial Ports. BARRET, 1875.
Construction of hydraulic works (Sea-ports). MINARD, 1846.
Establishment and maintenance of a sandy beach. TIMONOFF, 1891.
Foreign Ports, Dues on Shipping. URQUHART (G. D.), 1879.
Illumination and signalling. FAMBRI, 1879.
Improvements in Ports, Plans for. TAYLER (Capt. J. N.), 1840.
Maritime works and construction. CORDEMOY, 1886.
Maritime ports, their establishment and the maintenance of their depths. STOECKLIN (A.) and Laroche, 1879.
Port and Canal Rieter. BUZZI, 1863.
Proposal and port project of Edward Madero. HUERGO, 1886, '87.
Sand. Prevention of sandbanks. MERCADIER, 1788.
—— Formation of ports on a Sandy Coast in a Tideless Sea. TIMONOFF (V. E.), 1893.

PORTS—*continued.*

Sand. Improvement of ports established on low-lying sandy coasts similar to those of Belgium. GRIFFITH (J. P.), 1880.
—— On the improvement and maintenance of Sandy Beach Ports. MEY (P. de), 1894. Add. 520.
—— Maintenance of ports on sandy coasts liable to deposit silt. MEY, 1893.
—— On shallow and sandy coasts. BALDAQUE, 1888.

Alexandria Railways and Telegraphs. ALEXANDRIA, 1881.
Algiers. Foundations with blocks of mortar. POIRET, 1841.
Amsterdam. AMSTERDAM, 1892.
Antwerp, opening. AITKEN (R.), 1874.
—— Port of Antwerp. LUIGGI, 1886.
Barcelona. GARRAN, 1877.
Belgium, coast of. Improvement. MEY, 1885.
Birkenhead. WEBSTER (Thomas), Q.C., 1848.
Birkenhead and Liverpool. LUIGGI, 1889.
Bombay Tide Tables. ROBERTS (E.), 1880.
Boulogne, 1889. BOULOGNE.
—— New port south of Cape Grisnez. BOULOGNE, 1869.
Brazil. Improvement. GALVÃO, 1863.
Brindisi. MONTICELLI, 1833, '34.
Bristol Design for Terminal Station. RENDEL (J. M.), 1852; History, REID (W. N.) and HICKS (W. E.), [1879].
Buenos Ayres. On improved harbour accommodation. BATEMAN (J. F. La T.), 1871.
—— Report on Bolland and Whittle's Dock project. ECKERSLEY, 1875.
Caerleon old port. KIRBY (C.), 1891.
Calais. CHARGUÉRAUD, 1893.
—— 1875–89. VÉTILLART (H.), 1889.
Calcutta. Administrative Report, 1874–75. INDIA, p. 114.
—— With reference to the late Cyclone. ADLEY, 1864
—— Improvements in the Port, 1874–75. INDIA, p. 115.
—— Report on best means of extending the accommodation for shipping. INDIA, 1886. Add. 510.
—— Works constructed in the port, 1870–80. BRUCE (W. D.).
Cardiff. Plan of the proposed new Works. CARDIFF, 1865.
—— Nautical Observations. SMYTH (Admiral W. H.), 1840.
Cette. Outside Works. TIMONOFF (V. E.), 1888.
Chile. Constitución. CAPDEVILLE, 1894. Add. 490.
—— Constitución y Corral. CORDEMOY, 1893.
Chioggia. ROMANO (G. A.), 1875.

PORTS—*continued.*

Cinque Ports. Oral Traditions of the Cinque Ports and their localities. MARTIN (K. B.), 1832.

Croisic. Extraction of rocks from the entrance. LA GOURNERIE, 1848.

Dieppe. ALEXANDRE (P.), 1887.

Dublin. GRIFFITH (J. P.), 1888.

—— Recent improvements. STONEY (B. B.), 1877.

Dunkirk. CORDIER, 1820–28; PLOCQ, 1859–65.

—— Works in 1850 and 1851. PLOCQ, 1867.

—— Extension of the port. JOLY, 1893.

—— Bergues Lock. PLOCQ, 1867.

—— Port and roadstead. DUNKIRK, 1873.

Dunleary. Asylum Port near. DUNLEARY, 1809.

Edinburgh Port. Report on its improvement. WALKER (James), 1828, p. 393.

England. Commercial ports, financial Organisation. COLSON and Rourie, 1888.

English Channel Ports. RUSSELL (W. C.), 1884.

Ennis. Practicability of rendering the town a seaport. ENNIS, 1849.

Europe, Northern. Commercial Ports. PLOCQ and Laroche, 1882.

France, Ports of. FRANCE, 1841. Add. 501.

—— Sea Ports. REYNAULD (L.), 1883.

France, 1795, 1874. Departement of the Lower Seine, 1795. FRANCE, p. 437.

—— Bordeaux, Nantes, Rouen. VAUTHIER, 1882.

—— North Sea Belgian frontier to Cape Grisnez. DUMAS-VENCE, 1869.

Frankfort, construction of docks on the Main. LINDLEY (W. H.), 1888.

Galway as a packet station. STRYPE (W. G.), 1888.

Genoa. BOMPIANI and Luiggi, 1889; CIALDI, 1876, '78; CIALDI and others, 1876; GENOA, 1853, '86, '92.

—— Effects of Wind. CIALDI, 1876.

—— Hydraulic Installations, 1888, 1893. LUIGGI and Borgatti.

Germany, Ports of the Baltic. QUINETTE de Rochemont and Dreyfuss, 1891.

—— Ports of the North Sea. QUINETTE de Rochemont, 1891.

Goole. LUIGGI (L.), 1890.

Great Britain. Ports, Harbours and Watering Places. BARTLETT (W. H.), etc.

Grimsby. LUIGGI (L.), 1890.

PORTS—*continued.*

Havre. Bouniceau and Bellot, 1867 ; Hersent, 1884 ; Quinette de Rochemont, 1875, 1877, 1882, 1889, 1893.
—— Bassin Bellot. Desprez, 1887, 1889.
—— Two forms of Graving Dock. Havre, 1885–86.
—— History. Frissard, 1837.
—— Improvement of. Havre, 1884, 1886 ; Vauthier (L. L.), 1886 and 1888, pp. 367, 368.
—— Improvement of the entrance. Coene, 1886, 1890.
—— Its works and proposed improvements. Vétillart (H.), 1893.
—— Plan of, in 1848 and 1880. Havre.
—— Havre and ports of the Seine. Cordemoy, 1888.
—— Statistics. Havre, 1881.
—— Notes on the construction of the walls of the quay of the wet docks. Widmer (E.), 1885.
Heyst, coast of, establishment of a port. Mavant, 1892.
Holland. Rotterdam and Amsterdam. Quinette de Rochemont, 1890.
Horta, Fayal, Azores. Horta, 1877.
Hull. Luiggi (L.), 1890.
India. Vizagapatam ; Port of the Central Provinces. Thomas (E. C. G.), 1877.
Ipswich. Proposed Improvements Report, 1836. Palmer (H. R.).
—— Proposed new lock entrance and improvements in the river Orwell. Bateman (J. F. La T.), 1872.
Ireland. Maritime ports ancient and modern history. Marmion, 1856.
Italy Logatto, 1890.
King's Lynn Port. Wheeler (W. H.), 1882.
—— Improvement of the Navigation. Badeslade, 1729, 1766.
Languedoc. Mercadier, 1788.
Leghorn. Cialdi, 1855.
—— Improvements in the free port, 1835–42. Leghorn, 1854.
Leith. Plans for improvement of the port. Milne (John), 1835.
Leixões. Construction. 1884. Leixões.
—— Improvement. Soares, 1879, 1887–92.
Levant. Boemches, 1882.
Libau. History. Timonoff (V. E.), 1888.
Lido. Romano (G. A.), 1872.
—— Regulation of the port. Mati and Coutin.
Lisbon in 1882. Guerreiro, 1883.
—— Improvement of the port. Lisbon, 1884.
Liverpool. Littoral survey. Eyes, 1870.

PORTS—*continued.*

London, Port of, and the accommodations for shipping. Commerce. VAUGHAN (W.), 1796.

—— Act to authorize the advancement of a further sum of money for improvement, 1803. LONDON, p. 263.

—— Extracts from Acts of Parliament relative to Compensations. LONDON, p. 263.

—— Improvement of the Port of London. DODD, 1798.

—— Plan for improvement. EDEN, 1798.

—— Harbour and Port. ELMES (J.), 1838.

—— Account of its improvements. TELFORD (T.) and Douglass, 1802, p. 288.

—— Better regulation of the Port of London. HALL (John), 1827.

—— Miscellaneous Reports by the House of Commons, 1801. LONDON, p. 263.

—— Third Report of the Select Committee on Improvement, 1800. LONDON, p. 264.

—— Reports on Improvements, 1797. LONDON, p. 263.

—— Minutes of Evidence on the Bill for rendering it more commodious 1799, Act 1799. LONDON, p. 263.

—— Report of Select Committee on Improvement, 1801. LONDON, p. 263.

—— Report of Select Committee, 1836. LONDON, p. 263.

—— Reports of Committees of the House of Commons on Improvement, 1793–1802. LONDON, p. 263.

—— Report on accommodation for the increased Trade and Shipping. LONDON, p. 263.

—— By Laws, 1807. LONDON, p. 263.

—— By Laws for the government of the harbour masters, 1837. LONDON, p. 263.

—— Port and Trade. CAPPER (C.), 1862.

Malines, construction of a port. GORDON (A.) and Atherton, 1832, '37.

Manchester and Warrington, making of, into seaports. DUMBELL, 1826.

Marseilles and Antwerp. ROBERT (J.), 1888.

Marseilles Management. GUÉRARD, 1893.

—— Chamber of Commerce. GUÉRARD, 1889.

—— On the construction of a movable bridge on the pass de la Joliette. MARSEILLES, 1873.

—— Statistics. MARSEILLES, 1889.

Mediterranean, principal European Commercial ports. CIALDI, 1855; LAROCHE, 1885.

Mersey and Clyde. QUINETTE de Rochemont, 1892.

Middlesbro'-on-Tees, description. TURNBULL (G.), 1846.

PORTS—*continued.*

Milford Haven. Advantages, 1812. Report of Select Committee etc., 1827. Advantages, 1847. MILFORD Haven.

—— Eligibility of Milford Haven for Ocean Steamships and for a Naval Arsenal. PAGE (T.), 1859.

—— As a Naval and Commercial Packet Station. FISHER (J.), 1860.

Montevideo (project). ROBIDO and others, 1889.

Naples. Naples, 1861. Construction of two docks for careening. NAPLES, 1891.

—— Maritime stations for passengers. LO GATTO, 1892.

North Eastern Ports and Bristol Channel (Newcastle, Sunderland, the Hartlepools, Middlesbro', Bristol, Cardiff, Newport and Swansea). RUSSELL (W. C.), 1883.

Norwich. Means of making it a Port. THOROLD (W.), 1826.

Odessa. Historical and technical study on its development. TIMONOFF (V. E.), 1886.

Ostend. Variations in the level of the Sea. OSTEND, 1879–89.

Paris. Seaport. BOULÉ (A.), 1876. Evidence before the Commission of the Chamber of Deputies. QUINETTE de Rochemont (E. T.), 1894. Add. 529.

—— Exposé du projet de Paris port de Mer. BOUQUET de la Grye, 1879.

Pelusium, Bay of. PALÉOCAPA, 1857.

Pernambuco. FOURNIÉ and Lisboa, 1887.

—— Improvement. GALVÃO, 1867 ; MAUÁ, etc., 1868.

Persian Gulf. Euphrates Valley Railway. PARKES (W.), 1872.

Philadelphia. HAUPT (L. M.), 1892.

—— Improvement. HAUPT (L. M.), 1887. Add. 506.

Plymouth. Advantages and capabilities of the port. HARRIS, T. (1851).

Ponani. Memorandum on the Port of Ponani. INDIA, p. 128.

Ponta Delgada. PONTA DELGADA, 1877.

—— St. Michael's Island. Report relating to its improvement. TUCKER (J. S.), 1853.

Queensland. Report. QUEENSLAND, 1882–83, p. 71. Sailing Directions, 1894. QUEENSLAND, p. 71.

—— Gulf Ports. Survey. QUEENSLAND, 1884, p. 71.

Rangoon, Port of. Its working. SMITH (Chas. G.), 1883.

Recife. Improvement of the port. LISBOA, 1887.

Redcar. Port William at Redcar. BROOKS (W. A.), 1838.

Rotterdam. JONGH, 1892.

—— Report on improvement of sea approach. ROTTERDAM, 1858.

See also RIVERS, Maas.

PORTS—*continued.*

Rouen and Havre ports and the Seine Estuary.
VAUTHIER (L. L.), 1879, 1881, p. 368.

St. Hélier. Report on its improvement.
SAINT HÉLIER, 1868, 1870.

St. John's, Pondoland. Memorandum by Captain May.
ST. JOHN'S, Pondoland, 1880.

St. Pierre (Ile de la Réunion). CORDEMOY, 1888.

Southampton. SOUTHAMPTON, 1865.

Sunderland. Improvement. LABELYE, 1748.

—— State of the River Wear, harbour, piers, etc. DODD, 1794.

Toronto Port, terminal facilities of. Report.
WELLINGTON (A. M.), 1889.

Trieste. BOEMCHES, 1877, 1881, 1885. Petroleum basin.
BOEMCHES, 1882.

—— Navigable Canal. BUZZI, 1870.

—— Project for a new port. PONTINI, etc., 1863.

Valencia. Project. SUBERCASSE, 1856.

Venice. ROMANO (G. A.), 1875.

—— Improvement of the port, etc.
WIEBEKING (C. F. von), 1810.

—— Lido entrance. Improvements. SPADON (C.), 1893.

Vienna. SAINT-HUBERT (E. de), 1881.

Wisbeach. Improving the navigation. EDWARDS (L.), 1771.

Yarmouth (Great) Port and Haven. Report on the Extension of the North Pier and Improvements in the Haven.
TEASDEL (W.), 1867.

See also HARBOURS.

POSTS.

Ocean Post. RAINEY, 1858.

Pigeon Post. NANSOUTY, 1888.

Posts, past and present. TEGG (W.), 1878.

POST OFFICE.

Arrangements, new postal. HILL (Sir R.), 1841.

Bill to make further provision for the conveyance of Her Majesty's Mails, 1893. PARLIAMENTARY..Papers, p. 486.

Completion of his plan of Post Office Improvement.
HILL (Sir R.), 1843.

France. FRANCE, 1851, p. 437; GALLOIS, 1894.

General Post Office, connection with the Turnpike Roads.
FUGE, 1832.

New South Wales, Postal Guide, 1892. Report of Postmaster-General, 1887. NEW SOUTH WALES, p. 402.

Postal Services, Speeches in the House of Commons.
SAMUDA (Joseph D'A.), 1869.

POST OFFICE—*continued.*

System of contracting for the conveyance of the Public Mails. ANONYMOUS, 1847, p. 40.

Telephone Companies, Post Office and the. GENERAL Post Office, 1884.

POSTAGE.

(Penny) scheme of 1837. CHALMERS (P.), 1881, 1882, 1890.

—— Position of Sir Rowland Hill. CHALMERS (P.), 1882.

—— Adhesive Stamp. CHALMERS (P.), 1883.

—— Robert Wallace, M.P., and James Chalmers, the Scottish postal reformers. CHALMERS (P.), 1890.

—— State and prospects of Penny Postage. HILL (Sir R.), 1844.

POSTAL COMMUNICATION.

Ireland, Communication with. Report. PARLIAMENTARY..Papers, 1842. Add. 526.

London and Dublin Communication, 1842. PARLIAMENTARY..Papers, p. 496.

Sydney and London. Postal Communication by steam between. Report. SYDNEY, 1854. Add. 535.

—— Postal Communication with England. Report. SYDNEY, 1854. p. 274.

POTASH. Manufacture. KUÄBEL, 1881.

POTTERY. BEVAN (J. P.), Industries, vol. 7 ; ECK, 1836–41.

Ceramic Manufactures. Influence exercised on, by the late Herbert Minton. WYATT (M. D.), 1860.

Nature, production and uses of China Clay. COCK, 1880.

Porcelain and Earthenware, Nature and physical history of. BRAYLEY, 1845.

Porcelain and Pottery in Europe and Asia. GRASSE, 1872.

Pottery and Porcelain. Scientific and artistic aspects of. CHURCH (A. H.), 1881.

POWER.

Animal Power, advantages likely to result from the employment of animal power instead of Steam Power. DENISON, 1864.

—— and Voluntary Movement. BREGUET, 1811.

Energy, Conservation of. GALBRAITH (J.), 1877 ; WEYRAUCH, 1890.

—— and its transformations. COLSON, 1889.

—— Fundamental principles of, and their application to chemical phenomena. LE CHATELIER (H.), 1894. Add. 515.

—— Possible and impossible economies in the utilisation of. KENNEDY (A. B. W.), 1893.

—— The phrase "Potential energy." RANKINE (W. J. M.), 1867.

POWER—*continued.*

Energy. Utilization of potential energy. POLLITZER, 1883.
—— Thermal storage. Halpin's system. SCHONHEYDER (W.), 1893.
Power used in Manufactures. HOLLERITH, 1883, '88.
Power Engines. GRASHOF, 1886.
Solar Energy, conservation. SIEMENS (Sir W.), 1883, p. 198.

POWER (TRANSMISSION OF). CLAUSSEN, 1891; WAXWEILER, 1891.
Air (Compressed). Transmission of power by. ZAHNER (R.), 1878.
Belting, use of. COOPER (J. H.), 1878, 1891.
Central Stations, Development and Transmission of Power from. UNWIN (W. C.), 1894, p. 359.
Force, Transmission of, through solid bodies. LEGER.
Forces used by Engineers considered as Velocities. FARREN, 1893.
Motive Power, transmission and distribution at great distances. ACHARD (A.), 1876.
—— Municipal distribution. ACHARD (A.), 1891.
Power. Transmission of Energy. REYNOLDS (O.), 1883.
—— Transmission of Power by Fluid pressure, Air and Water. DONALDSON (W.), 1888.
—— —— by crank and winch. MASSAN, 1891.
—— —— by metal cables. ANONYMOUS, 1860, p. 57.
—— —— by shafting and gearing. BALE, 1894.
—— —— by straps, ropes and metal cables. LELOUTRE, 1884.
—— Manual of Power for machines, shafts, and belts. WEBBER (S.), 1879.
—— Notes on the present position of the question of Transmission of Power. STEAVENSON (A. L.), 1891.
Power without fuel. BALDWIN (J. S.), 1869.
Return of Power in Electric and Cable Traction. BRYSON, 1889.
Steam, Transmission of Power by. MERIVALE, 1886.
Water. Atlantic (Middle) Watershed, Water Power of, Report on. SWAIN (G. F.), 1885.
—— Atlantic (Southern) Watershed, Water Power of, Report. SWAIN (G. F.), 1885.
—— Geneva, transmission of Power by Water. ACHARD (A.), 1890.
—— Inverness. Water power in the neighbourhood of. INVERNESS, 1892.
—— New England (Eastern) Streams, Water Power of, Report. SWAIN (G. F.), 1885.
—— Niagara Falls. Utilization of their power. SELLERS (C.), 1891.
—— Niagara Falls Power Company. Report, Mortgage, 1891. NIAGARA Falls.

POWER (Transmission of)—*continued.*
Water. Periyar Works, Utilisation of Water Power at, 1893. India, p. 128.
—— Rhone. Utilization of the motive power of the Rhone and the regulation of Lake Geneva. Geneva; Turrettini (T.), 1890.
Wire Ropes, Transmission of Power by. Stahl (A. W.), 1877.
See also Electricity (Transmission of Power.)

PRECIOUS METALS. History. Delmar, 1880.
Statistics and Technology. Emmons and Becker, 1885.
United States. Statistics of Production. King (C.), 1881.

PRECIOUS STONES. Morris (J.), 1870.
Diamonds. Ball (V.), 1881.
Extraction by means of Mitchell's patented amalgamating machinery. Mitchell (John), 1858.

PRESSURE.
Atmospheric Pressure. Its effects, including the Caisson Disease. Smith (Andrew H.), 1873.
Pressure. High temperature work in igneous fusion and ebullition in relation to. Barns, 1893.
Pressure of wheat stored in elongated Cells or Bins. Roberts (I.), 1882, p. 118.
Pressures of Granular Substances vertical and lateral. Roberts (I.), 1884, p. 118.

PRICES.
Prices of commodities, graphical representation. Favaro, 1875.
Scale of prices for job work on old ships. Clark (N. G.), 1825.
Scheme of Prices for performing mast-makers' work, boat-builders' work, smiths' work, joiners' work, bricklayers' work, etc. Anonymous, 1829, p. 55.
Spon's Architects' and Builders' Price Books. Young (W.), 1878, '86, '90, '92, '93.
Tables (Price) specially designed for use in the iron, steel, etc., trades. Beecroft, 1877.

PRINTING. Bevan (J. P.), Industries, vol. 8.
Anastatic Printing and Papyrography. De la Motte, 1849.
Caxton and the Art. Caxton, 1852.
Clowes and Sons' printing office, Description of. Head (Sir F. B.).
Electro-Typing. Urquhart (J. W.), 1881.
Machines in France and abroad. Monet, 1878.
Origin and progress of. Anonymous, 1770, p. 42.
Photo-chemical printing methods. Bolas, 1884.
—— Application of Photography to the production of printing surfaces and pictures in pigment. Bolas, 1878.

PRISONS.

Commissioners of Prisons Report, 1878.
PARLIAMENTARY..Papers, p. 496.

Convict Prisons. Reports of Directors, 1874, '78.
PARLIAMENTARY..Papers, p. 496.

Means of improving counties by the Labour of criminals.
SIBLEY (R.), 1828.

Report of Committee on the employment of Convicts, 1887.
PARLIAMENTARY..Papers, p. 473.

Reports relating to Prison for juvenile offenders, 1837.
PARLIAMENTARY..Papers, p. 496.

Reports respecting Prisons, 1838. PARLIAMENTARY..Papers, p. 496.

Reports of Surveyor-General of Prisons, 1844–50.
PARLIAMENTARY..Papers, p. 496.

Ventilation and Warming of Prisons. PRICE (H. C.), 1844.

Bury St. Edmunds. Gaol at. ORRIDGE, 1819.

Dover Harbour. Papers relating to employment of Convicts at, 1883. PARLIAMENTARY..Papers, p. 473.

England. Manner in which sentences of Penal Servitude are carried out in England. DU CANE, 1882.

India. Sanitary Condition and Discipline of Indian Jails.
EWART (Joseph), 1860.

Madras. Operations in the Prison Department, 1859–60.
INDIA, p. 124.

Pentonville and Portland Prisons, Report, 1844.
PARLIAMENTARY..Papers, p. 496.

Scotch prisons. Report. SCOTLAND, 1840, p. 175.

West Indies, Prisons Report. WEST Indies, 1838.

PROFESSIONS. Dictionnaire of professions, or Guide in the choice of a calling. CHARTON (E.), 1880.

PROFIT SHARING between Employer and Employee.
GILMAN (N. P.), 1889.

In what trades is it practicable? CHADWICK (D.), 1890.

PROJECTILES.

Causes of deviation in elongated projectiles.
BARNARD (J. G.), 1860.

Flight of Projectiles. ANSTRUTHER, P. (1866).

Laws of Projectiles. BUSK, 1860.

Mathematical treatise on the Motion of Projectiles.
BASHFORTH, 1873.

Motion. COTES, 1770. App. 552.

PROJECTILES—*continued.*

Penetration of Projectiles into earthen parapets.
BOILEAU (W.), 1874.

Resistance of the air to the motion of elongated projectiles.
BASHFORTH, 1868; DIDION, 1857.

Tables of remaining velocity, time of flight and energy of projectiles. BASHFORTH, 1871.

Text-book on the theory of the motion of Projectiles.
ANONYMOUS (1877), p. 57.

Trajectory of a Projectile. ANSTRUTHER, P. (1868).

Weapons (Projectile) of war and explosive compounds.
SCOFFERN (J.), 1858.

See also ARTILLERY (Projectiles).

PROPERTY. MARTIN (Jules), 1871.

Creation of Intellectual Property. JOBARD, 1843.

Property (Landed). Science and practice of valuation according to practice in Lombardy. CANTALUPI, 1856.

PROPELLERS.

Hydraulic Propeller (Ruthven) *versus* the Screw and Paddle.
ANONYMOUS (1869), p. 55.

Improved methods of propelling Vessels. HOLEBROOK, 1838.

Locomotive and Marine Engines. Application of the motive power to Propellers. BEESLEY, 1877.

Manganese Bronze for Steamship Propellers.
ANONYMOUS, 1883, p. 50.

Marine Propellers. BARNABY (S. W.), 1885, 1891.

Mechanical principles of the action of Propellers.
FROUDE (W.), 1862; RANKINE (W. J. M.), 1865.

Plan for propelling Ships by submerged Propellers amidships.
MILLER (W. V.), 1857.

Propulsion by Atmospheric Pressure. MEADE, 1879.

Specification of Improvements in Propelling Vessels.
HEWETT, 1855.

See also SCREW PROPELLERS.

PROSPECTOR'S HANDBOOK. ANDERSON (J. W.), 1887.

PROTECTION. Prosperity of Landholders not dependent on the Corn Laws. JEVONS, 1840.

United States. "What the West says of Protection."
PALMER (F. W.), 1873.

PSYCHOLOGY. HERBART, 1822.

Seeing and Thinking. CLIFFORD (W. K.), 1890.

PUBLIC WORKS.

Folklore of Public Works. SEBILLOT (P.), 1894.

Giornale dei lavori pubblici, etc. PERIODICAL PUBLICATIONS, p. 16.

Loans Manual, tables and rules for the use of local authorities. COTTON (C. P.), 1890.

Manual of Procedure under various Acts. COTTON (C. P.), 1887.

Mechanics of public works. MOUGEL and Mouchelet, 1840.

National Finance in connection with construction. ANONYMOUS (1866), p. 53.

Need of models and drawings to accompany communications relative to construction and details. GRAINGER (T.), 1849.

Revista de obras públicas. PERIODICAL PUBLICATIONS, p. 23.

—— Index. BORREGON, 1875.

Revue générale de l'Architecture et des Travaux publics. PERIODICAL PUBLICATIONS, p. 23.

Revue universelle . . . des travaux publics. PERIODICAL PUBLICATIONS, p. 24.

Working plans and practical details of construction of the most celebrated engineers. BREES, 1837.

Argentine Republic. ARGENTINE.

Australia (South). Public Works. Amount spent on them. SOUTH AUSTRALIA, 1878, p. 229.

—— Appointment of Engineer, 1875; Government Works and Tender, 1877; Conditions of Contract, 1878, etc. SOUTH AUSTRALIA, p. 228.

—— Public Works report, 1866. SOUTH AUSTRALIA, 1867, p. 228.

Australia (Western). Public Works, Reports. WESTERN AUSTRALIA, 1878, 1885, 1871.

Belgium, Public Works, 1830–39. BELGIUM, 1840. Add. 485; 1843, &c. BELGIUM, p. 117; TEISSERENC, 1839.

—— Annales des travaux publics de Belgique. PERIODICAL PUBLICATIONS, p. 10.

Brazil. BRAZIL, 1876.

British and American Public Works of recent construction. WEALE (J.), 1856.

British Columbia Report. BRITISH COLUMBIA, 1872.

Canada, Reports. CANADA, 1860–83, p. 218.

Canterbury, New Zealand. CANTERBURY, N.Z., 1861–68.

Cape Colony. Reports of the Chief Inspector, 1866–82. CAPE COLONY, p. 221.

Ceylon. Report on the Department, 1867–68. MOLESWORTH.

—— Reports, 1870, &c., 1879. INDIA, p. 116.

—— Public Works Commission, 1880. INDIA, p. 116.

—— Minutes of Sir H. G. Ward. INDIA, p. 116.

PUBLIC WORKS—*continued.*

Chicago Reports. CHICAGO, 1869–89.
Chili. CHILI, 1888–91.
Croydon Public Works: South Norwood Public Baths. WALKER (T.), 1890.
Dublin, Report. NEVILLE (P.), 1869.
Egypt. BELLEFONDS, 1872–73.
England. DUTENS, 1819; FRANQUEVILLE, 1875
England and France. DUPIN, 1823.
France. CHEVALIER, 1840–41; FRANCE, 1866, '80, p. 437; LAMÉ, Clapeyron, and Flachat, 1832.
—— Administrative Law. COTELLE, 1859–62.
Great Britain. DUPIN, 1825; SIMMS (F. W.), 1836, p. 201.
—— Progress in the Cotton district. RAWLINSON (Sir R.), 1866.
Holland. CROIZETTE-DESNOYERS, 1874; HOLLAND, p. 65.
Hull, Municipal Engineering in. WHITE (A. E.), 1889.
Hyderabad, Operations in the Nizam's Dominions, 1867–84. INDIA, p. 120.
India. BELL (E.) and Tyrrell, 1871; BINNIE (A. R.), 1881.
—— Public Works for 1869–81. STRACHEY (Sir J. and R.)
—— Bombay Administration. Reports, 1882–83, etc. INDIA, p. 112.
—— Civil Works, 1885–86, etc. INDIA, p. 112.
—— Military Works, 1885–86, etc. INDIA, p. 112.
—— Conference, 1866. INDIA, p. 112.
—— Budget, 1864–65, etc. INDIA, p. 112.
—— Relative position of Civil and Military Engineers. INSTITUTION of Civ. Eng.
—— Coopers Hill College. ARGYLL (Duke of).
—— Indian Public Works from the earliest Times. MACGEORGE (G. W.), 1894. Add. 517.
—— Economic restoration of India. CONNELL (A. E.), 1883.
—— Indian Works and English Engineers. BOURNE (J.), 1870.
—— Indian Public Works Finance, Exchanges and Loans and Water Conservancy and Communications. WOOD (W. M.), 1877, '83.
—— Indian Public Works and cognate Indian topics. THORNTON (W. T.), 1875.
—— Observations on the methods of carrying on the Public Works. TURNBULL (G.), 1870.
—— Profits on British capital. COTTON (Sir A.), 1856.
—— Importance. COTTON (Sir A.), 1854.
—— Public Works Department. Progress Reports, 1854–55, 1860–61, 1864–65. INDIA, p. 103.
—— Code of Regulations, 1858, '59, '70. INDIA, pp. 103–4

PUBLIC WORKS—*continued.*

India Public Works Department Standing orders, 1852, '68. INDIA, p. 104.

—— India Reform. INDIA, p. 104.

—— Report of Select Committee, 1878. INDIA, p. 104.

—— Report of Conference at Poona, 1865. INDIA, p. 104.

—— Public Works Reform. TYRRELL (F.), 1873.

—— Why so Costly? THOMASON (C. S.), 1871.

Ireland. Present State of the Irish Grand Jury Law as it respects the promotion and execution of Public Works. LINDSAY (H. L.), 1837.

—— Reports of Commissioners, 1833, etc. IRELAND, p. 142.

—— Reports of Royal Commission, 1887–88. IRELAND, p. 142.

—— Irish Reproductive Loan Fund Act, 1874. IRELAND, p. 142.

—— Report of Board of Works Inquiry Committee, 1878. IRELAND, p. 142.

—— Longford District. MULVANY (T. J.) and Gisborne, 1850.

Italy. ITALY, p. 147.

Japan. BRUNTON (R. H.), 1875.

Leicester. GORDON (J.), 1884.

Madras Department of Public Works. Circular and Standing Orders, 1833–57. GRANT (W.).

—— Reports, Budget, etc., 1853–79. INDIA, p. 124.

New South Wales. Annual Statement, 1888, '91. NEW SOUTH WALES, p. 402.

—— Report of Parliamentary Standing Committee. NEW SOUTH WALES, p. 402.

New York. Annual Reports of Commissioner, 1870, etc. NEW YORK CITY.

New Zealand, 1870 to 1877. BULL (W. J.), 1877.

—— Hokitika and Greymouth. Reports. HOKITIKA, 1877.

—— Reports of Engineers, 1871–72, 1887. NEW ZEALAND, pp. 410–11.

—— Statements, 1871–88. NEW ZEALAND, p. 410.

—— Contracts in which penalties have accrued and been enforced, 1878. NEW ZEALAND, p. 410.

—— Further Regulations under the Public Works Act, 1877. NEW ZEALAND, p. 410.

Paris. Annales des travaux publics. PERIODICAL PUBLICATIONS, p. 10.

—— Public Works of Paris. LASTEYRIE, 1861.

—— Subterranean Paris. Works. BELGRAND, 1873–87.

Perak. Departmental Regulations, 1885. INDIA, p. 128.

Portugal. Legislation, etc. PORTUGAL, 1853–88.

Prussia, Execution of Public Works in. PRUSSIA, 1851–52.

PUBLIC WORKS—*continued.*

Russia, Southern. Report on proposed Public Works in. RUMBALL (A.), 1867.

St. Mary's Loch Scheme and Princes Street Gardens, Edinburgh. ST. MARY'S LOCH, 1870.

St. Louis Board of Public Improvements. Report. ST. LOUIS, 1879.

Spain. SPAIN, p. 235.

Tasmania. Reports. BELL (C. N.)

—— Report of Royal Commission on, and Replies and Remarks on the Report. TASMANIA, 1886.

Travancore. Administration Reports, 1867, 1869. JOHNSTON (T. M. H.).

United States, 1824–31. POUSSIN, 1834. 1870, MALÉZIEUX, 1873.

—— Reports on Canals, Railways, Roads, etc. STRICKLAND (W.), 1826.

See also MUNICIPALITIES.

PUBLISHING. Method. SPRIGGE (S. S.), 1891.

International exchange of publications. ARGENTINE Republic, 1885. Add. 481.

PULLEYS.

Pulley block and buckle (self-sustaining). ADDIS (F. H.), 1890.

Trains of Pulleys and Drums of least weight for a given velocity ratio. HENNESSY, 1887.

PUMPS. RIEDLER, 1885, '88.

Adcock's Spray Pump. ADCOCK, 1846.

Air Pump. Description of an improved, and experiments made with it. CAVALLO (T.), 1784. App. 551.

—— Essay on. TURNBULL (W.), 1847.

—— (Mercurial). Development. THOMPSON (S. P.), 1888.

Chain Pumps, portable and fixed. MURRAY (C.), 1859.

Construction. JEEP, 1871.

Filter-pumps, or Water-jet Aspirators. FAIRLEY, 1887.

Guide for calculating and fixing Pumps. ELDRIDGE, 1878.

Handbook for pump users. BALE, 1889.

Historical, theoretical and practical. BJÖRLING, 1890.

Improvements in steam pumps and their working. REULEAUX (F.), 1887.

Patent Hydraulic Pumping Arrangement, Joseph Moore's. MOORE (R. T.), 1891.

Pumping machinery. BARR (W. M.), 1893.

Pumps and pumping machinery. COLYER, 1882, 1892.

Relative economic efficiency of a reciprocating pump, a rotary pump and a Steam Siphon pump. ISHERWOOD, 1889.

Rotary Pump (Improved) and Engine. HEPPEL, 1855.

PUMPS—*continued.*

Self-acting pump valve. BACH, 1887.

Shalders' Gravitating Expressing Fountain. SHALDERS (W.), 1831.

Ships' pump. A New Hydraulic Machine. SCOTT (M.), 1847, p. 176.

Spiral Pump, applied as a force pump, a suction pump, or mercury pump. AIRY (W.), 1869.

Steam Pumps. REULEAUX, 1886.

Steam Pumps and Pumping Engines. HUTTON (F. R.), 1888.

Theoretical and practical treatise on water-raising machines. POILLON, 1885–88.

Water Ballast Pumps and Storage Bags. WHITE (D. B.), 1851.

Windmill Pumps. STEWART (T.), 1885.

Working pumps, improved method for. MICHELL (T.), 1850.

PUMPS (CENTRIFUGAL).

Centrifugal Pumps. DURAND CLAYE (A.), 1873; RITTINGER, 1858

Centrifugal Pumping machinery for Reclamations, Sewage and Dock Works. GWYNNE (J. and W.), 1885.

Direct-acting balanced Centrifugal Pump. GWYNNE (J. S.), 1850.

Gwynne's Centrifugal Force Pumps. Experiments. TRESCA (H.), 1860.

Khatatbeh. Farcot Centrifugal pumps. BRÜLL, 1887.

PUMPS (PUMPING ENGINES).

Differential expansive Pumping engine. DAVEY, 1880.

Double-acting Pumping Engines. SIMPSON (J.) and Co., 1883.

Duty Trial of a Fly-wheel High duty, Automatic cut off cross-compound. BLAKE Manufacturing Company, 1892.

Handbook on direct-acting Pumping Engine and Steam Pump Construction. BJÖRLING, 1889.

Influence of Steam jackets of the Pawtucket Pumping Engine. JACOBUS, 1890.

Nagle Pumping Engine. PROVIDENCE Steam Engine Co., 1876.

Reynolds Corliss Pumping Engines. Duty Tests. ALLIS and Co., 1894. Add. 480.

Speed of suction attainable with double-action pumping-engines having high lift. HUET (A.), 1892.

Brooklyn Pumping Engines of 1860. BROOKLYN Waterworks, 1860, 1862; MCELROY, 1891.

Hope Station, Providence. PROVIDENCE, 1876.

Louisville Water Co. Report of experts appointed to test Pumping Engine No. 3. LOUISVILLE Water Co., 1894. Add, 516.

Newton, Mass. Experiment with pumping engine, supplying Water to the City of. ISHERWOOD, 1893.

PYRAMIDS.
Probable Mode of Construction. PERIGAL (H.), 1844.
Solution of the Pyramid Problem. BALLARD (R.), 1882.

Egypt, Great Pyramid. DAY (St. J. V.), 1870.
—— Cubits used in the design of the Great Pyramid. JAMES (Sir H.), 1869.
—— Great Pyramid of Gizeh. WACKERBARTH (A. F. D.), 1871.

PYROLOGY. Pyrological Terms and Calculations. Reform in. HANSSEN (C. J.), 1889.

PYROMETER.
Pyrometer, Electrical resistance. SIEMENS (Sir W.), 1875, p. 198.
Pyrometry and Areometry. Essay on. DELUC (J. A.), 1779. App. 553.

Q.

QUADRANTS.

Description of an improvement in the application of Quadrant of Altitude, to a celestial globe for resolution of problems dependent on Azimuth and altitude. SMEATON (J.), 1788. App. 576.

Description and use of a curious Quadrant. ROWLEY (J.), 1756.

Gunter's Quadrant. History. LEYBOURN and Leadbetter, 1731.

Hadley's Quadrant. JONES (Wm.), 1808. History, HADLEY (1840). Directions for use, with remarks on its construction. LUDLAM (W.), 1808. App. 566.

History. ANONYMOUS, 1832. App. 544.

Mural Quadrants. Method of Constructing. BIRD (J.), 1768; BIRD (J.), 1768. App. 548.

Sea Quadrant, Description and use of a new. ADAMS (G.), 1748. App. 543.

QUANTITIES AND COSTS.

Contractor's Book of working drawings of tools and machines used in constructing canals, railroads and other works. COLE (G.), 1855.

Measuring and computing. POLE, 1885.

QUANTITIES AND MEASUREMENTS. How to calculate and take them. BEATON, 1875, 1885.

QUARRIES.

Report on the quarrying of stone, limestone, slate and clay, 1894. PARLIAMENTARY..Papers, p. 499.

Anglesea Limeworks Building Stone and Mona Marble Quarries. Report. SMITH (William), 1874.

Belgium. Production, 1871–78. FIRKET.

Colwill Quarry. Nitro-glycerine explosion. COLWILL, 1890.

Derbyshire—Stone Edge, Warden, Bole Hill, and Heddon stone quarries. STONE EDGE QUARRY, 1840.

Explosions. Grin Quarries, Burbage, near Buxton, Explosion, 1890. BURBAGE.

Sandstone Quarries. Queensland, Southern districts. QUEENSLAND, 1888, p. 72.

QUARANTINE.

Hygiene of Ships and Quarantine. COLLINGRIDGE (W.), 1894. Add. 493.

Observations on Quarantine. MACLEAN, 1824.

Reports, 1849–54. PARLIAMENTARY..Papers, p. 499.

QUARTZ.

Double Refraction of Quartz. Nature of the light in the two rays produced by. AIRY, Sir G. B. (1831), p. 21.

Expansion of quartz. LE CHATELIER (H.), 1889.

Operator's Handbook. RANDALL (P. M.), 1888.

Rotatory polarisation of quartz. LE CHATELIER (H.), 1889.

QUAYS.

Quay Walls in slimy soils. NYBERG, 1893.

Clyde Navigation. Report on Quay walls. WALKER (James), 1860, p. 393.

Newcastle-on-Tyne. Ballast Quay at the Lime Kiln Shore, North Shields. Letting by the Corporation of Newcastle, 1886. NORTH Shields.

—— Design for Quay Wall. WARON (C.), 1876.

Rouen. Lighting. COULON, 1880.

Thames Quay. Collection of papers relating to. TRENCH (Sir F. W.), 1827.

QUICKSILVER. *See* MERCURY.

R.

RACE COURSES. Legislation. La Ruelle, 1887.

RADIATION. Forbes (G.), 1878

RAILWAYS (General References). Adamson (Rev. J.), 1826; Anonymous, 1846, p. 55; Anonymous (Canals), p. 41; Baclé, 1882; Cantalupi, 1857–58; Chabrier, 1879; Clarke (H.), 1846; Freycinet, 1878; Gerstner, 1827; Gil y Montaña, 1866; Hodgkinson (J.), 1825; Jervis (W. P.), 1867; Lefèvre and Cerbelaud, 1888; Pontzen and Fleury, 1887; Redesdale and France, 1867; Thomason Civil Engineering Coll., 1862–4.

Accounts. Classification of Railroad Accounts and Analysis of Railroad Rates. Mordecai (G.), 1888.

Accounts, dividends, progress, present position and future prospects. Webb (C. L.), 1849.

Accounts and Finance. Fisher (J. A.), 1891.

—— Model form of Railway accounts. Hulse, 1858.

Administration. Lampugnani, 1887. Add. 514; Tennant (R.), 1886.

Agriculture, Importance to. Johnson (C. W.), 1840.

Album encyclopédique. Broise and Thieffry.

Almanack, 1860. Lever.

Amalgamation of railways and highways for agricultural improvement. Great Britain and the Colonies. Adams (W. B.), 1850.

—— Railway Amalgamations. Graves (S. R.), 1872. Haughton (B.), 1872.

—— Railways amalgamated and grouped in competing systems. Haughton (B.), 1873.

—— Reports, 1845, 1846, 1848, 1872. Parliamentary..Papers, p. 501.

—— Reports of Select Committee on Railways and Canals Amalgamation, 1846. Parliamentary..Papers, p. 501.

American and European Practice. Holley, 1861.

American Railroad Journal. Periodical Publications, p. 9.

Analysis of Railways. Whishaw (F.), 1837, '38.

Annuaire des chemins de fer. Periodical Publications, p. 11.

Annuaire officiel des chemins de fer. Chaix & Cie., 1866.

Appeal to the public. Godwin, 1837.

RAILWAYS (General References)—*continued.*

Appliances, railway construction subsequent to the completion of the earthworks and structure. Barry (J. W.), 1876.

Beton Coignet and Goodridge system of constructing and repairing Railway and other structures. Goodridge, 1883.

Block System, Handrailing on the. Twiss (W.), 1878.

Board of Trade. Board of Trade, 1845, 1851.

Board of Trade Regulations for Railway Companies, 1879, '81. Parliamentary..Papers, p. 500.

—— Documents on opening of a railway, 1891. Parliamentary..Papers, p. 500.

—— Return of Orders under the Regulation of Railways Act, 1889. Parliamentary..Papers, p. 500.

—— Rules, 1888. Parliamentary..Papers, p. 505.

—— Railway Department. Minute upon projected railway schemes, 1845. Parliamentary..Papers, p. 499.

—— Reports of the Railway Department of the Board of Trade, 1845. Parliamentary..Papers, p. 499.

—— Reports of the Officers of the Railway Department, 1840–45. Parliamentary..Papers, p. 499.

—— Report, 1851–58. Parliamentary..Papers, p. 500.

Bradshaw's Map of the Railways of Great Britain, Tables of the gradients. Bradshaw (G.), 1839.

Branch Railways. A letter. Sharpe (E.), 1857.

Bridges and Viaducts. Anonymous, 1885, p. 46.

Buildings. Wulff, 1881.

Canals, Railway, and Canal Commission practice. Butterworth, 1889.

—— Railways compared with Canals and Common Roads. Anonymous (1825), p. 54.

—— Reports of the Railway and Canal Commission, 1890, &c. Parliamentary..Papers, p. 500.

—— Comparative merit of Railways and Canals. Anonymous, 1832, p. 48.

—— Comparative performances of motive power on canals and railroads. Grahame (T.), 1831.

—— Railway and Canal Combination. Grahame (T.), 1852.

—— How the Railway Companies are crippling British Industry and destroying the Canals. Spence (E.), 1882.

Capital in Railways. Considerations on the Expediency of sinking. Vallance (J.), 1825.

Classification (General) of goods by merchandise trains. Anonymous, 1874, p. 46.

Clearing House. Description by Sir F. Head, 1849. London and North Western Railway, p. 276.

RAILWAYS (GENERAL REFERENCES)—*continued.*

Clearing House. Distance Book. RAILWAY, 1878–84.

—— English Clearing House in 1876. DOWDEN.

Commission (Railway) Reports, 1867.
PARLIAMENTARY..Papers, p. 500.

—— Railway Commissioners, Reports of Cases.
NEVILLE (R.) and Macnamara, 1874–91.

—— Reports of Railway Commissioners, 1846–50, 1875–88. Indexes, 1837–46. PARLIAMENTARY..Papers, p. 500

Committee, Select, on Railway Communication. Reports, 1840.
PARLIAMENTARY..Papers, p. 499.

Communication, Railway. WHITE (W.), 1850–1.

Communication, Railway. Report of Select Committee on Railroad Communication, 1838. PARLIAMENTARY..Papers, p. 499.

Communication between Passenger and Guard. MORRIS (H.), 1881.

—— What system of, between Passengers, Guards, and Drivers, ought to be adopted on our Railways?
ANONYMOUS (1870), p. 58.

—— Robert's patent Communicator. BROWNE (W. R.), 1875.

Comparative merit of cast metal and malleable iron Railways.
ANONYMOUS (1832), p. 54.

—— Means of comparing the respective advantages of different lines of Railway. NAVIER, 1836.

Compensation (Railway) Practice. HOPKINS (R.), 1849.

—— Value of Estates, and Parochial Assessment.
MORRIS (T.), 1863.

Conditions of the Conversion of single lines into double lines.
NÖRDLING, 1862.

Conference on the technical and economical conditions of proper organization. VAUTHIER (L. L.), 1879.

Construction. ADAMS (W. B.), 1837; AIX, 1875; ANONYMOUS, 1888, p. 43; BARLOW (P.), 1837, 1851; EVANS (W. W.), 1872; HASKOLL (W. D.), 1857–64; LARMANJAT, 1870; MACGEE, 1891.

—— Atlas, 1887–88. ENGINEERING News.

—— Danger of the present mode of Railway Construction.
GREENHOW, 1846.

—— Railway Engineering. BAKER (T.), 1848.

—— Construction Facilities Act, 1864. WORDSWORTH (C. F. F.).

—— Construction and formation of Railways. DAY (J.), 1848.

—— Construction and service. CISNEROS, 1884.

—— Construction and working of railways of local interest.
LEVEL, 1870.

—— Construction, working, etc. FADDA, 1887. Add. 499.
SCHOELLER (A.), 1892.

—— Handbook. VOSE (G. L.), 1857.

RAILWAYS (General References)—*continued.*

Construction. Instructions on the science. Anonymous, 1866, p. 55.
—— Lectures. Unwin (W. C.), 1870.
—— Mode of constructing Railways on the continuous bearing principle. Reynolds (J.), 1837.
—— New System. Wydroff (V. de), 1843.
—— Notice on a very advantageous system. Wiebeking (C. F. von), 1842.
—— Reform. Smith (O.), 1891.
—— Science. Stephenson (Sir R. M.), 1874.
—— Standard Specifications. Yates (J. A.), 1886.
—— Temporary expedients in Railway Construction. Lean, 1881.
—— Tunnels, permanent way, etc. Construction of. Villevert (E.), 1866.
Conveyance upon Railways compared with that of Canals. Anonymous, 1831, p. 43.
Cost of working. Belpaire (A.), 1847.
—— (Prime) of Transport. France, Germany and Austria. Nördling, 1885.
Curtis's inventions. Curtis (W. J.), 1840.
Deposits. Coates, 1864.
Deterioration of Railway Plant and Road. Huish, 1849.
Dictionary. Palaa, 1864.
Dividends (Railway). Dowden, 1876.
Economics. Economical railways. Chabrier, 1874; Pontzen, 1883.
—— Economic conditions of railway working in different countries. Jeans (J. S.), 1887.
—— Economy in Railways. Lapparent (A. de), 1891. Add. 514.
—— Economy of Railways considered chiefly with reference to Australasian Colonies. Peppercorne (F. S.), 1870.
—— Railroad Economics. Robinson (S. W.), 1882.
Electrical fittings. Kohlführst, 1883.
Elementary Treatise. Perdonnet (A.) (1855–6); 2nd edition, (1858–60).
Elements of Railroading, etc. Paine, 1885.
Embankments of double or single lines. Grover (J. W.), 1866, '70.
Encyclopædia. Röll, 1890–94.
Engineering (Railway). Baker (T.), 1848; Cotton (C. P.), 1874; Galbraith (W.), 1842; Nesbit, 1847; Passos, 1873.
—— Railway Engineer. Periodical Publications, p. 22.
—— Railway Engineer's Practice. Cleeman, 1880, '83.
—— Railroad Engineers' Field-book and Explorers' Guide. Godwin (H. C.), 1890.

RAILWAYS (General References)—*continued.*

Engineering (Railway). Field-book for Railroad Engineers. Henck, 1877.

—— Engineers' Journal and Railway and Public Works Chronicle of India. Periodical Publications, p. 15.

—— Handbook of Engineering Science. Heusinger von Waldegg, 1877, 1883. Add. 507.

—— Manual for Railroad Engineers and Students. Vose (G. L.), '81.

—— Manual of engineer. Weinschenck, 1882.

—— Practical Railway Engineer. Dempsey, 1855.

—— Engineering Structures. Osborne, 1885.

Essays on Railways presented to the Highland Society. Stevenson (R.), 1824.

Expense of Railway Transport. Dowden, 1885.

Express Trains. Advantages and inconveniences. Martin (Jules), 1892.

Extension, Railway. 1877. Longridge.

Field Engineer. Practice in the survey, etc., of railroads. Shunk (W. F.), 1880.

Fothergill, Samuelson and Smith *v.* The Ashbury Railway Carriage and Iron Company, 1864. Fothergill.

Friction and gravitation. Resistance to traction from. Dixon (J.), 1861.

Fuel for vehicles of all classes. Regray, 1876.

Giornale dei lavori pubblici e delle strade ferrate. Periodical Publications, p. 16.

Gliding Railway at the Crystal Palace, Sydenham. Barre, 1891.

Grease box. Delaitre, 1856.

Herapath's Railway Journal. Periodical Publications, p. 16.

Highways. Gradual abolition of the Crossing of, by Railroads at grade. Locke, Webber and Kimball, 1889.

Historical and Descriptive. Parsloe, 1878.

Hygiene. Csatáry, 1891.

Illustrations of Railway Bridges, Railway Sheds, &c. Lysaght (J.), 1888.

Internal Working. Phillips (E.), 1874.

International Railway Congresses: Brussels, 1885; Milan, 1887; Paris, 1889; St. Petersburg, 1892. International R. Cong.

Inventor of Railway Locomotion. Hedley (O. D.), 1858; Hedley (W.), 1882.

'Investigator's' pamphlet relative to Railways. Observations on. Capper (C. H.), 1831.

Investment. Theory of, in Railway Companies. Clarke (H.), 1846.

Iron, Our, Railways. Watherston (E. J.), 1882.

RAILWAYS (GENERAL REFERENCES)—*continued.*

Iron, Our, Roads. WILLIAMS (F. S.), 1852, '83.

Iron Railway. Superiority of, over conveyance on Turnpike Roads, etc. ANONYMOUS, 1820, 1823, p. 50.

Iron and Timber Railway Superstructure. GROVER (J. W.), 1874.

Joint stock railway schemes. Suspension of. FAIRBAIRN (H.), 1836.

Journal des Chemins de fer. PERIODICAL PUBLICATIONS, p. 17.

Judgments of the Railway Commission, 1885.
PARLIAMENTARY..Papers, p. 505.

Land steam conveyance. GRAY (T.) 1825.

Laying out, building and management. KLEMM, 1844.

Laying out Railway Turnouts instantly. New system of, by inspection from tables. CLARK (J. M.), 1884.

Letter on Railroads. ANONYMOUS, 1825, p. 48.

Lightning Express Railway service, 120 to 150 miles per hour.
BEHR, 1893.

List, Railway, January, 1886. WILLING and Co., 1886.

Local interest, Railways of. MARTIN (Jules), 1879, '88.

Location of Railways, Economic Theory of.
WELLINGTON (A. M.), 1877, '87.

Locomotion, Railway. CURR, 1847.

—— Advantages of locomotion by locomotive carriages instead of by Steam-tugs. GORDON (L. D. B.), 1849.

—— Railways and Locomotives.
BARRY (J. W.) and BRAMWELL, 1882.

—— Story of the Locomotive and the Railway. FRITH, 1893.

Locomotives and Carriages shown at the Paris Exhibition of 1889.
SOCIÉTÉ des Chemins de Fer Italiens, etc., 1889.

—— Public reasons against Railroads with Locomotive motions.
ANONYMOUS (1825), p. 53.

Machine Construction. MEYER (G.), 1833–6.

Machinery, Railway. CLARK (D. K.), 1855.

—— Improvements. Specification of Dunn's Patents.
DUNN (T.), 1860.

Maintenance and Working. GOSCHLER, 1865–68.

Making, Railway. Ensamples of. WEALE (J.), 1843.

Management. BROWN (H.), 1853; ECKERSLEY, 1848; FAIRLIE, 1868; HUISH, 1848; LAWFORD (W.), 1874.

—— Digest of the opinion of Parliament on the Powers and Management of Railways. GRAHAME (J.), 1886.

—— Report of Select Committee, 1846.
PARLIAMENTARY..Papers, p. 505.

—— Suggestions for simplifying working, and for the prevention of accidents. WEIR (F. C.), 1874.

Mechanical and engineering operations and structures combined in the working of a railway. DEMPSEY, 1845–46.

RAILWAYS (General References)—*continued.*

Mechanism, Railway. Weissenborn (G.), 1879.
Mensuration, Railway. Gardner (E. V.), 1847.
Merchandise Traffic, 1888, Classification of. Draft Rules. Parliamentary..Papers, p. 507.
Mineral Traffic, money cost. Conder, 1877.
Mining Journal and Railway...Gazette. Periodical Publications, p. 19.
Mode of travelling. Anonymous, 1839, p. 54.
Modern Railways and Railway Travelling. Marshall (W. P.), 1888.
Monopolies, Railway, and Remedial Measures. Gordon (A.), 1841.
Motive Power and Brake Power. Naylor, 1868.
Multiple Speed and Traction Railway or movable sidewalk. Multiple Speed, 1892.
Necessity for a National System. Mudge, 1837.
New principle, Railway on a. Palmer (H. R), 1823, '24.
Newspaper Cuttings. Anonymous, p. 54.
Notes on Railways. Dowden, 1873.
Organisation of economical service. Buschman, 1881.
Origin and Problems. Adams, C. F., jun., 1879.
—— of the Train Staff. Watts, 1888.
Papers relating to Railways. Page (Col. F.), 1843. Add. 525.
Parliamentary Practice. Riddell (H.), 1846.
Passenger traffic on Railways in Austria and Hungary. Austria (1891).
—— Development of Railway Passenger Traffic. James (E. J.), 1890.
Passenger Traffic, England. Comparative Analysis for 1883–87. Chapman (S.), 1889.
—— Railway passenger duty. Anonymous (1875), p. 53; Reasons for repeal. Collett, 1877.
Passenger transit, early history of. James (W. and W. H.), 1861.
—— Returns of Passengers who travelled on sixty-three railways in the United Kingdom, 1846; on all railways, 1847–48. Parliamentary..Papers, p. 505.
Past and present views of Railways. Gordon (A.), 1849; Martin (R. M.), 1849.
Patent Post and Railway. Humphreys (H. T.), 1870.
Pioneer or Steam Caravan. Haddan, T. L. (1878).
Plan for Railways. Reynolds (J.), 1836.
Political Economy. Fairbairn (H.), 1836.
Portfolio of a Railway Engineer. Perdonnet (A.) and Polonceau (C.) (1866–7).
Position, Present. Thomas (J. L.), 1867.

RAILWAYS (General References)—*continued.*

Power consumed in overcoming the Inertia of Railway Trains. Barlow (P. W.), 1848

Practice and railway possibilities. Adams, W. B. (1868).

Problem, Railway. Hill (J.), 1870 ; Fink, 1880.

Property, Railway, as it is and as it should be. Woodhouse (T.), 1848.

Public and private economy. Gordon (A.), 1837.

Purchase of Railways. Say (L.), 1881.

Railroad and Engineering journal. Periodical Publications, p. 22.

Railroad Gazette. Periodical Publications, p. 22.

Rails and Railways. Corlett, 1860.

Railway Chronicle. Periodical Publications, p. 22.

Railway News and Joint Stock Journal. Periodical Publications, p. 22.

Railway Register. Periodical Publications, p. 22.

Railway Review. Periodical Publications, p. 22.

Railway Times. Periodical Publications, p. 22.

Rambles on Railways. Roney (Sir C. P.), 1868.

Rates. Association of Chambers of Commerce, 1884–91 ; Grierson (J.), 1886 ; Pope (J. B.), 1884.

—— Railway rates on iron. British Iron Trade, 1885.

—— Rates and Fares. Report of Select Committee, 1882. Parliamentary..Papers, p. 505.

—— Return by Railway Companies showing rates charged, 1887. Parliamentary..Papers, p. 505.

—— Return of maximum Rates and Charges, 1888. List of Railway Companies, 1889. Objections, 1889. Schedule, 1889. List of differences, 1889. Table of Fares, 1889. Parliamentary..Papers, p. 506.

—— Reports of Board of Trade on Unfair Rates, 1890, '91. Parliamentary..Papers, pp. 506–7

—— Reports of Board of Trade, 1890. Parliamentary..Papers, p. 507.

—— Bill empowering Railway Companies to enter into special contracts for the conveyance of Commercial Travellers, 1891. Parliamentary..Papers, p. 507.

—— Reports of Select Committees, 1891, '92, '93. Parliamentary..Papers, pp. 507–8.

—— Return of Railway Companies, 1892. Parliamentary..Papers, p. 507.

—— Rules of the Board of Trade, 1892. Parliamentary..Papers, p. 507.

—— Lists of articles charged at rates other than ordinary rates, 1893. Parliamentary..Papers, p. 507.

RAILWAYS (GENERAL REFERENCES)—*continued.*

Rates. Correspondence between the Board of Trade and Railway Companies with regard to Revised Rates, 1893.
PARLIAMENTARY..Papers, p. 508.
Rating of Railways. HEDLEY (T. F.), 1883; PLESSNER, 1866.
Receipts and expenditure of a proposed Railway, Probable
VANDRUNEN (J.), 1885.
Reciprocal action of Railways and Political Economy.
GUNESCH, 1876.
Reform, Railway. ANONYMOUS (1843, 1844), p. 53; GALT, 1865.
—— Rights of Shareholders and the Public in the Railway Highways of the United Kingdom. TROUP (J.), 1846.
Regulation of Earnings, working, and distribution of profits of Railway Companies. MANGLES, 1874.
Remunerative Railways for new countries. RAPIER, 1878.
Reorganization, Railway. STERNE (S.), 1890.
Reports on Railways. ANONYMOUS (1824), p. 54; SYLVESTER (C.), 1825.
Repurchase, danger to the public interest. MALO, 1880.
Resistance of the Atmosphere to Railway Trains.
BESSEMER, 1847; HARDING (W.), 1846.
Resistance of trains and the power of engines.
VUILLEMIN (L.), Guebhard and Dieudonné, 1868.
Revue générale des chemins de fer. PERIODICAL PUBLICATIONS, p. 23.
Right of way for Railroads. HALL (Julien A.), 1891.
Rise, progress, and construction. RITCHIE (R.), 1846.
Royal Commission. Report, 1867. HILL (Sir R.).
Rural and Undeveloped Districts, Railways for.
WALTON (J. B.), 1888.
Safety, Railway. CREAMER, 1863; MARTIN (Jules), 1892.
Safety Appliances, Patented Railway. WILLIAMS (H.), 1890.
School of Railway Affairs. WEBER (M. M. von), 1862.
Security. MALO, 1882.
Security (public) by means of the electric coupling.
ACHARD (A.) 1861, '62.
Select Committees, Reports 1839, 1841, 1844, 1846, 1881.
PARLIAMENTARY..Papers, p. 499.
Selection of projected lines, with description of the Railway scale.
ANONYMOUS, 1847, p. 51.
Servants killed and injured. Return, 1870–94.
PARLIAMENTARY..Papers, p. 509.
—— Number of persons employed on Railways, 1848.
PARLIAMENTARY..Papers, p. 508.
—— Returns, 1886, etc., 1890, '92.
PARLIAMENTARY..Papers, p. 508.
—— Hours of Duty of Signalmen, Drivers, and Guards, 1891.
PARLIAMENTARY..Papers, p. 508.

RAILWAYS (General References)—*continued.*

Servants killed and injured. Reports of Select Committee on Hours of Labour, 1891, '92. Parliamentary..Papers, p. 508.

—— Return of hours of duty in respect to Accidents, 1892. Parliamentary..Papers, p. 508.

Shareholders' Advocate and Railway Review. Periodical Publications, p. 25.

—— Railway Shareholders' Association. Railway, 1882 ,p. 79.

—— Bills to remove disabilities of Shareholders to act at Licensing Sessions, 1890, '91. Parliamentary..Papers, p. 509.

—— Shareholders' Guide, Railway Manual and Directory. Bradshaw (G.), 1854, etc.

Snow clearing. Targé, 1847.

—— Means of preventing accumulations of. Nördling, 1865.

Snow, removal of, on American and European railways. Pontzen (E.), 1874.

Special technics. Heusinger von Waldegg, 1870. Add. 507.

Specification. Guppy, 1856.

Speed on Railways from a commercial point of view. Sidney (S.), 1847.

—— Running and through speed. Dowden, 1885.

—— Tables for calculating the Speed of Trains with various loads. Dowden, 1878, 1884.

Spondyloid Life Train. [Carriages connected by elastic shields.] Garvey, 1876.

State, Appropriation of the Railways by the. Williams (A. J.), 1870.

—— Argument for State Purchase. Hole (J.), 1893.

—— Ought the State to buy them? Anonymous, 1873, p. 51.

—— Purchase of Railways. Waring (C.), 1886.

—— Regulations, State ownership. Adams (C. J. jun.), 1873.

—— Our Railways: should they be private or national property. Watherston (E. J.), 1879.

—— State Railways and Companies. Baum, 1876.

—— Plan for lessening Taxation by State Purchase of Railways. Anonymous, 1860, p. 52.

Statistics. Railway Statistics. Salt (S.), 1845; Clarke (H.), 1845–48.

Steam Railway. Description of, also of Rotary Engine. Vignoles (C. B.), 1846.

Streets and Railways. Coloured plates and views. Ashdown and Others.

—— Railway and Street Railway Track. Improvement of. Tratman (E. E. R.), 1890.

RAILWAYS (GENERAL REFERENCES)—*continued.*

Structures. Report of Commission on application of Iron, 1849. PARLIAMENTARY..Papers, p. 509.

—— Report of Committee on the practicability of assigning a safe co-efficient for the use of Steel, 1877. PARLIAMENTARY..Papers, p. 509.

—— Report of Committee on the question of Wind Pressure, 1881. PARLIAMENTARY..Papers, p. 509.

Substructure. WINKLER, 1877.

Sunday Travelling. Remarks on the regulation of Railway Travelling on Sundays. STURGE (J.), 1836.

—— Regulations. PARLIAMENTARY..Papers, p. 509.

Superstructure. DEHARME, 1890.

System, Railway, and its author Thomas Gray. WILSON (Thomas), 1845, '60.

Tables for execution of railways. MEISSAS, 1860.

Tables for setting out Half-widths. OLVER, 1870.

Tables and Formulas for Railroad Engineers. HARDAWAY, 1886.

Tariffs. MARTIN (Jules), 1890.

—— Tariffs and authority of the State. AUCOC, 1879–85.

—— Measures for securing stable, equitable and indiscriminating Railway tariffs. FINK, 1885.

Terminal, Railroad, facilities. Report. PROVIDENCE, 1888.

Thoughts on Railways and projected Railways. ANONYMOUS, 1833, p. 57.

Time Table, Railway, and Speed Calculator. FLEMING (W.), 1868.

Toll Question on Railways exemplified in the case of the Croydon and Greenwich Companies. WILKINSON (W. A.), 1841.

"Tracé." Laying out. BAUDSON, 1884.

Track of Railways, Construction of the. MUIR (W. J. C.), 1867.

Traction, alleged loss of power at high speeds. DIXON (J.), 1864.

—— Automatic arrangement for the control of. GIOPPO, 1884.

Traffic unity, popularly called "Railway Pools." BLANCHARD, 1884.

—— Statistics regarding the movement of eastbound and west, bound traffic over the Trunk lines and connecting roads. FINK, 1884.

Trains. Circular on means of communication between different parts of a train, 1865. PARLIAMENTARY..Papers, p. 510.

—— Return of arrival at London Stations of all passenger trains, 1890. PARLIAMENTARY..Papers, p. 510.

—— Returns of Trains. PARLIAMENTARY..Papers, p. 510.

Tramways, Railways and. BEVAN (G. P.), Industries, vol. 10.

RAILWAYS (General References)—*continued.*

Tramways and railways on historic roads. Challot, 1877.
Transit, Railway. Conder, 1841.
Transport. A . . . review of . . . Railways, etc. Periodical Publications, p. 25.
—— Railway Transport Committee at Delhi, 1876. Reid (Sir C.).
—— Adjustment of Railroad Transportation Rates to the Seaboard. Fink, 1882.
—— Cost of Transportation on Railroads. Ellet (C.), jun., 1844.
—— Transportation, its history and laws. Hadley, A. T. (1885).
—— Transportation. Respective uses of Waterways and Railways. Schromm (A.), 1892.
Treatise, Practical. Humbert, 1901 ; Lecount, 1839 ; Wood (N.), 1831, '34, '38.
Turnpike Roads into Railroads, Plan for converting. Fairbairn (H.), 1836.
Useful information for railway men. Hamilton (W. G.), 1872.
Uses and management. Anonymous 1842, p. 54.
Waterpower, Use of. Switzerland. Morell, 1875.
Waterways and Railroads, their co-operation and their reciprocal competition in the Rhine Basin. Landgraf, 1892.
—— Respective positions in transportation in the U.S.A. Roberts (T. P.), 1892.
—— Respective uses of Waterways and Railroads. Fleury, 1892.
—— Respective uses of Waterways and Railways in Transport Industry. Pescheck, 1892.
Workshops. Technology. Oberstadt, 1881.
Working. Emion, 1864 ; Jacqmin, 1868 ; Flamache and Huberti, 1885.
—— Working economy of European and American lines. Colburn and Holley, 1858.
—— Saving of dead weight in passenger trains. Fay, 1857.

RAILWAYS (General References) : Places.

Aarau. Building Sheds. Riggenbach (N.), 1878.
Abbotsbury. Classification of Merchandise Traffic. Abbotsbury Railway, 1891.
Aberystwith and Welsh Coast Railway. Plans and Sections. Aberystwith.
Abyssinia. Pioneer Railway. Haddan, J. L., 1873.
Africa. Trans-Saharian railway (Paris to the Cape). Bouniceau, 1883.

RAILWAYS (General References): Places—*continued.*

Akaroa Railway, Lakes Ellesmere and Forsyth Reclamation and. Johnston (T. M. H.), 1878.

—— Little River and. Johnston (T. M. H.), 1879.

Alabama Great Southern Railway Act. Alabama, 1888.

Alegre (Porto) to Uruguayana. Penna and others, 1875.

Alexandria, Port of. Alexandria, 1881.

Allegheny Mountain in Pennsylvania, Postage Rail-road over. Roberts (S. W.), 1836.

Alpine Railways. Alps; Flachat, 1859.

Alps and the Eastern mails. Roney (Sir C. P.), 1867.

Alsace. Bazaine and Chaperon, 1844.

America. Lavoinne and Pontzen, 1880; Martin (Jules), 1887–88.

—— Railway Association of America. Railway, 1875.

—— Buildings and Structures. Berg (W. G.), 1893, p. 485.

—— Development of American Rail and Track. Watkins (J. E.), 1891.

—— Manual for the United States and the Dominion. Vernon (E.), 1873.

—— Street Railway Journal (Investments), 1894, etc. Periodical Publications. Add. 527.

—— Surveys with a view to the establishment of a railroad from the Coal and Iron Mines near Blossburg or Peter's Camp to the State line at Lawrenceville. Taylor (R. C.), 1833.

—— European and North American Railway. Plan for shortening the time of passage between New York and London. European, 1850.

—— American and Canadian Railways. Marshall (W. P.), 1884.

America (South). Antioquia [Colombia]. Cisneros, 1878.

—— Cauca [Colombia]. Cisneros, 1878.

—— Inter-oceanic Railway between Bahia Blanca [Argentine] and Talcahuano [Chile]. Duffy (R.), 1886.

—— Madeira and Mamoré. Commission. Morsing, 1884.

Amsterdam and Rotterdam Railway. Conrad (F. W.), 1844, 1848.

Andalusia. Compañia de los Ferrocarriles, 1887.

Andino-Argentine Railway, concession for construction. Andes, 1879; Villanueva, 1882–3.

Argentine Republic. Argentine; Huergo, 1872; Kemmann, 1892.

—— Central Argentine Railway. Central Argentine Ry., 1869.

—— Central Railways of Corrientes and of Monte Caseros á Misiones. Clark (J. E.), 1887.

RAILWAYS (General References): Places—*continued.*

Argentine Republic. Specifications for Bridge Work, roofing, steel rails, etc. Central Argentine Ry., 1884–87.

—— Extension from Cordova and connection of Bolivia with the Valley and Water of the La Plata. Moneta, 1867.

Arlberg. Nördling and others, 1880. Alternative scheme. Nördling, 1879.

Asian, Central, Railways. Their laying out. MM. Lesseps and Cotard's projects. Stuart (A.), 1875.

Asia Minor. Ismid to Angora. Forchheimer, 1891.

Atlantic and Great Western Railroad. Atlantic and Great Western Railroad (1878–79).

—— Reorganisation Trustees. Ford (J.), 1881.

—— "Kidnapping" a Railway. McHenry, 1881.

Atlantic Railway. Knight, 1836.

Australia. Kadina and Wallaroo Railway. Report, 1877. Kadina and Wallaroo Rly. Add. 513.

—— Australian Transcontinental Railway Report. Robinson (John), Civil Engineer, 1882.

Australia, South. Adelaide to Nairne. Cost of constructing a Railway. South Australia, 1878, p. 229.

—— Plans and Sections. South Australia, 1879, p. 229.

—— Reports and Estimates. Nairne, 1878.

—— Railway from Border Town. Report on. South Australia, 1877, p. 229.

—— Railway from Dry Creek to Teatree. Estimate. Dry Creek, 1878.

—— Railway from Frances to Hundred of Tatiara. Plans, sections, etc. South Australia, 1878, p. 229.

—— Grange and Military Road Railway Bill, 1878. Report of the Select Committee. South Australia, 1878, p. 229.

—— Holdfast Bay Railway Bill, 1878. Holdfast Bay.

—— Light Railway from Kingston, Lacepede Railway to Naracoorte. Lacepede Bay, 1871–72.

—— Mount Barker and Strathalbyn Line. Mount Barker, 1881, '82.

—— North Line Railway. Tonnage and passenger traffic Returns. South Australia, 1878, p. 229.

—— Observations on Railways made during a tour. South Australia, 1884, p. 229.

—— Palmerston and Pine Creek Line. Palmerston, 1885.

—— Port Augusta and Government Gums Railway. Working expenses. Port Augusta, 1878.

—— —— Survey. Port Augusta, 1871.

—— Port Augusta and Northern Railway. Port Augusta, 1871.

RAILWAYS (General References): Places—*continued.*

Australia, South. Port Pirie and Mount Ferguson Railway. Port Pirie, 1873.

—— —— Termini. Port Pirie, 1873.

—— Amount spent on Railways. South Australia, 1878, p. 229.

—— Railway Commissioners. Reports. South Australia, 1888, p. 228.

—— Railway Construction. Report. South Australia, 1873, 1875, p. 228.

—— Cost and Revenue. South Australia, 1877, p. 228.

—— Diagrams of Accommodation Works. South Australia, p. 228.

—— Goods agency agreement. South Australia, 1867, p. 228.

—— Railway Goods Tariff. Correspondence. South Australia, 1877, p. 228.

—— Railway Goods Traffic tender. Correspondence. South Australia, 1867, p. 228.

—— Photographs. South Australian, 1880, p. 229.

—— Report of Commission on Public Works. South Australia, 1880, p. 229.

—— Return showing weight of Gross load and the net or paying load which the most powerful engine now employed on the Government Railways can transport at the speed of 20 miles per hour. South Australia, 1878, p. 229.

—— Riverton and Clare Railway. Estimated cost. Riverton, S. Australia, 1878.

—— Rosstown Railway. Report. Rosstown, 1878.

—— Railway to Victorian Border from Adelaide. Probable cost, etc. South Australia, 1878, p. 229.

—— George Town and Port Pirie Railway. Goods traffic return. George Town, 1878.

Australia, West. Geraldton and Northampton Railway. Papers respecting terminus at Northampton. Geraldton, 1878.

—— Eastern Railway. Report on the improvement of Grades between Guildford and Spencer's Brook. Western Australia, 1893, p. 423.

—— Fremantle to Perth and Guildford. Proposed Railway. Correspondence relating to. Western Australia, 1878, p. 423.

—— Government Railways. Report during 1890. Western Australia, 1891, p. 423.

—— Proposed Railway from Guildford to Blue Stone Quarries. Western Australia, 1878, p. 423.

—— Midland of Western Australia Land and Railway Company. Notes, 1885. Midland of W. Australia; Western Australia, 1884, p. 423.

RAILWAYS (General References): Places—*continued.*

Australia, West. Southern Cross branch of the Northam-Yilgarn Railway. Conditions of Contract, Specifications, etc., for the Construction of. Western Australia, 1892.

Austria. Austria, 1868, 1879; Ghega, 1854. Working by the State. Kramer, 1887.

—— Austrian Southern Railway. Description of the works with account of their cost. Flattich (W.), 1870, '73.

Austro-Hungarian Railways. Statistics. Austria, 1880.

—— Statistical Tables on the train haulage and workshop service. Geiringer, 1876.

Aylesbury and Buckingham Railway. Classification of Merchandise Traffic. Aylesbury and Buckingham, 1891.

Ayrshire and Wigtownshire Railway. Ayrshire and Wigtownshire (1891).

Bahia and San Francisco Railway. Report. Bahia, 1891.

Ballycastle Railway. Classification of Merchandise Traffic. Ballycastle, 1891.

Baltimore and Ohio Railroad. Baltimore, 1855, 1882; Pangborn, 1883.

—— Railway structure for a new track. Knight (J.), 1838.

Barry Railway. Description. Robinson (John), Architect, 1888.

Batavia to the harbour at Tandjong Priok. Batavia, 1876.

Baturité. Baturité, 1880.

Belgium. Railways. Belgium, 1840. Add. 485; Depouhon, 1833; Rawson (R. W.), 1839. 1842. Dobson.

—— 1835–65. Loisel, 1867.

—— Antwerp and Ostend to Cologne Railway. Simons and Ridder, 1839.

—— Antwerp, Brussels, Liége and Verviers. Simons and Ridder, 1833.

—— Commission of Tariffs, 1841. Belgium, p. 117.

—— Du prix des transports. Jullien (P. A. A.), 1844.

—— Hainaut line. Belgium, 1837, p. 117.

—— Historical, statistical, and scientific account. Dobson, 1843.

—— History of first twenty-five years. Laveleye, 1862.

—— Jubilee (50th year). Kohl (B. E.), 1886.

—— L'Entre-Sambre-et-Meuse. Belgium, 1844, p. 117.

—— State Railways, 1879–81. Belgium, p. 117.

—— Statistics of Traffic, 1844 and 1845. Clarke (H.)

—— System of girders between Serres and Battig. Laveleye, 1878.

—— Tariffs for goods and passengers on Belgian State Railways. Belgium, 1891, p. 117.

—— Working. Royal decrees, 1838. Belgium, p. 117.

RAILWAYS (General References): Places—*continued.*

Bengal, Eastern, Railway. Illustrated Handbook. Ham (G.), 1862.

Berlin. Building. Berlin, 1886.

—— Fast traffic. Kemmann, 1894.

—— Metropolitan Railway. Buzzi, 1833.

Bhatinda Bikanir Railway. Benedict, 1890.

Bhavnagar State Railway. Reports. Proctor-Sims, 1877.

Birmingham and Lichfield Junction Railway. Minutes of Evidence before the Select Committee. Birmingham and L. Rly., 1878.

—— Railway Companion from London to Birmingham, Liverpool and Manchester. Freeling, 1837.

—— London and Birmingham Railway. Roscoe (T.), 1838. Drawings. Bourne (J. C.), 1839.

—— Iron Road-book and Railway Companion, London to Birmingham, Manchester and Liverpool, etc. Coghlan (F.), 1838.

—— Plan of the line and adjacent country. London and N. W. Rly., 1835. Add. 516.

—— London to Boxmoor. Map. Cheffins (C. F.), 1837.

—— Birmingham to Rugby, and Birmingham to Wolverhampton. Map. Cheffins (C. F.), 1837.

Bishop's Castle Railway. Classification Rates of Merchandise Traffic and Maximum Rates. Bishop's Castle Railway, 1891.

Bolan and Khyber Railways. Andrew (Sir W. P.), 1871.

Bolivar. Report and documents. Cisneros, 1887.

Bombay Presidency. Railway Communication. Chapman (J.), 1851.

—— Railways for Bombay, 1849. India, p. 113.

—— Cost of working, 1864. India, p. 113.

—— Railway communication between Bombay and the North-West Provinces. India, p. 113.

Bosnia. Nördling, 1882, '83.

Boston and Albany Railroad Company. Diagrams of maintenance of way. Dudley (P. H.), 1882.

Boston and Providence Railroad. Surveys. Act, 1832. McNeill, 1832. Reports, 1833–4. Boston and P. R.

Boulogne and Amiens. Best line of communication between. Cubitt (Sir W.), 1843. Report. Cubitt (Sir W.), 1844.

Brazil. Almeida Torres, 1883. Add. 480; Brazil, 1880, 1883; Carvalho, 1885; Pessoa, 1886.

—— Alagoinhas-Joazeiro-Casa Nova Railway. Bulhoes, [1880.]

—— Bridge for the Alagoas Railway. Ende, 1891.

—— History, legislation and development. Chrockatt de Sa, 1893.

RAILWAYS (General References): Places—*continued.*

Brazil. Madeira and Mamore. Madeira, Brazil, 1885; Mathews, 1875.

—— Mines, Victoria Railway. Costa Aloes, 1876.

—— Paraná to Matto Grosso. Lloyd (W.), 1875; Mauá, 1875.

—— Proposed Railway in the Province of Pernambuco. Borthwick, 1853.

—— S. Paulo Railway Company. Pending Questions between the Brazilian Government and the Company. Passos (J. P.), 1872.

—— Railway in 1876–79. Passos (F. P.).

Brecon and Merthyr Tydfil Junction Railway. Report on classification of merchandise and schedule of maximum rates. Brecon, 1891.

Bridport Railway. Classification of merchandise traffic and schedule of maximum rates. Bridport, 1891.

Bridgwater Railway. Geology. Clarke (J. F. M.), 1891.

Brighton Railway, Report on several proposed lines for. Gibbs (J.), 1836. Add. 502.

—— London and Brighton junction railroad. Fortune, 1825.

Brighton and South Coast Railway. Project for removing the Crystal Palace to Sydenham, 1852. London, Brighton, etc.

—— Specifications, contracts, and estimates of works, 1863–85. London, Brighton, etc.

—— Minutes of Evidence before Committee, 1836, 1837. London, Brighton, etc.

—— Proposed Railway to Brighton, 1836. Minutes of Evidence, 1836. London, Brighton, etc.

—— Railway Accidents. Excessive hours of work, 1889. London, Brighton, etc.

—— Rates and charges, 1891. London, Brighton, etc.

—— Report of Directors, 1837. London, Brighton, etc.

—— Proposed railroad without a tunnel, 1836. London, Brighton, etc.

—— Reports. Rastrick and Locke, 1837.

Brisbane and Ipswich Railway Construction, Progress, etc. Reports. Brisbane, 1873, 1875, 1876.

Bristol and Exeter Railway. Letter to Shareholders. Gravatt, 1841.

—— Benefits from a railroad between Bristol and London. Britton, 1833.

British, in relation to British trade and government control. Anonymous, 1885, p. 41.

—— Passenger services, rolling stock, locomotives, gradients, and express speeds. Pattinson, 1893.

British Railway System. Maclean, 1883.

RAILWAYS (General References): Places—*continued.*

British and Foreign Railway Company. Railway investments. British and Foreign, 1872.

British Columbia. Survey for a Railway. British Columbia, 1860.

Buckley Railway. Classification of Merchandise Traffic and Schedule of maximum rates. Buckley Railway, 1891.

Buenos Ayres. Juson, 1875. Proposed Transandine Railway to connect with Chile by a line over the Planchon Pass. Crawford (R.), 1872.

—— Interoceanic. Bustamente, 1886.

Burmah and China, Railway connection of. Colquhoun and Hallett, 1887; Hallett (H. S.), 1887.

Burmah Railway. Contracts for Ironwork for Bridges, etc., 1887. India, p. 114.

Calcutta Railway. Andrews, J., 1837.

Calcutta and Saugur Railway, 1838. India, p. 114.

Calcutta and South Eastern Railway from Calcutta to the river Mutla. Longridge, 1857.

Caledonian Railway. Graham (G.), 1888; Report to shareholders, Jan. 3, 1868; Caledonian Railway. Add. 490.

—— Newspaper cuttings relative to the Railway and its originators. Caledonian Railway, 1890

—— Traffic Receipts of the principal Railways. Caledonian Railway, 1885–90.

—— Report by Board of Trade on the Classification of Merchandise Traffic and schedule of maximum rates. Caledonian Railway, 1891.

—— Reports on the Conversion of Stock Bill. Caledonian Railway, 1890.

California. Central Pacific Railroad, first division of fifty miles. Judah, 1863.

Canada. Reports of the Minister for Railways and Canals, 1881, etc. Canada, p. 218.

—— Maps. Canada, 1882, p. 218.

—— Statistics, 1875, etc. Canada, p. 218

—— Report of Railway Commission, 1888. Canada, p. 218.

—— Necessity of Intercolonial and Atlantic and Pacific Railways through British North-American Possessions. Archibald (C. D.), 1860.

—— British North America, proposed communication from the Atlantic to the Pacific. Doull, 1850, 1851, 1852.

—— Great National Railway between Atlantic and Pacific, Construction. Employment of people and Capital of Great Britain in her own Colonies. Smyth (Major R. C.), 1849.

—— Line uniting the inland and Atlantic provinces of the Dominion. Fleming (S.), 1876.

RAILWAYS (General References): Places—*continued.*

Canada. Grand Trunk Railway of Canada. Hewson (M. B.), 1876; Addresses, 1869. Nelson (J.). Reports, 1855, '60, '61, '77. Grand Trunk; Reports, 1859, '67. Blackwell (T. E.), 1860; Tyler (H. W.), 1867.

—— —— Victoria Bridge. Cheapest mode of bridging the St. Lawrence at Montreal. M'Calmont, 1856.

—— —— Works and rolling stock. Gregory (Sir C. H.), 1857.

—— Intercolonial Railway. Doull, 1868. Annual Report, 1872. Intercolonial.

—— North Shore Railway between Quebec and Montreal. Supplementary Report, 1875. North Shore Rly.

—— Canadian Pacific Railway. Hewson (M. B.), 1879, 1880; Keefer (T. C.), 1888.

—— —— Canadian Pacific Rly. and its Assailants. Canadian Pacific Rly., 1882. Add. 490.

—— —— Contracts, Reports, etc. Canadian Pacific Railway. Speech. Tupper (Sir C.), 1879.

—— Short Line Railway connecting the Canadian Pacific Railway with the principal Atlantic ports of the Dominion of Canada. Keating, 1885.

—— Quebec, Montreal, Ottawa and Occidental Railway. Report. Quebec, etc., 1878.

—— From St. Lawrence to the Atlantic sea-board. Quebec and New Brunswick Railway, 1871.

—— South Ontario Pacific and the Toronto, Hamilton and Buffalo Railways. Routes proposed. Haskins (W.), 1889.

Canton, 10,000 miles of Railroad, etc., to connect London with. Rogers (S. B.), 1844.

Cape Colony. Contracts, Reports, Expenditure, etc. Cape Colony, pp. 221–222.

—— Railway Extension in the Colony. Kilgour, 1881.

—— Proposed Railway between Cape Town and Wellington. Cape Town.

Cape Town. Report of Railway and Dock Company, 1858. Cape Town.

Cardiff and Monmouthshire Valleys Railway. Select Committee of the House of Lords. Cardiff, 1887.

Ceylon. Doyne, 1860.

—— Future in connection with its Railway System. Torrington (Viscount), 1860.

—— Report on Government Survey. Moorson (W. S.), 1857.

—— Reports, 1868–78. India, p. 116.

—— Extension Reports, 1875–79. India, p. 116.

—— Correspondence relating to Railway Extension, 1870. India, p. 116.

RAILWAYS (General References): Places—*continued.*

Ceylon. Haputale Extension, 1888. India, p. 116.
—— Nawalipitiya to Nanu Oya Extension, 1879. India, p. 116.
—— Extension to Bandarawela, 1892. India, p. 116.
—— To Chilaw, 1887. India, p. 116.
—— To Galle, 1892. India, p. 116.
—— To Kurunégala, 1892. India, p. 116.
—— To Matara, 1891. India, p. 116.
—— To Nawalapitiya, 1870. India, p. 117.
—— —— From Pérádeniya. Estimated receipts and profits, 1870. India, p. 116.
—— To Uva, 1885. India, p. 117.
—— Jaffna Railway Survey, 1892. India, p. 116.
—— Reports, 1859, '71, '74, '86, '90–'91. India, pp. 116–117.
—— Light Railways, 1870. India, p. 117.
—— Report of Chief Resident Locomotive Engineer, 1879. India, p. 117.
—— Reports of General Manager of Railways, 1885, etc. India, p. 117.
—— Kelani Valley Railway Commission. Report. India, 1894. Add. 510.
—— —— Report on the preliminary inspection of the country between Veyangoda and Dehiowita. India, 1894. Add. 510.
Chambéry to Turin. Maus, 1850.
Channel Railway. Leslie (B.), 1880; Nursey, 1876.
—— Plan for conveying Railway trains across the Straits of Dover. Leigh (E.), 1870.
—— Dover to Cape Grisnez. Proposed Submarine Railway from. Turner (R. and T.), 1840.
—— Channel Railway connecting England and France. Chalmers (J.), 1861, 1867.
—— Channel Railway. Projected. Anonymous, 1869. Add. 481.
See also Tunnels.
Chatham and Dover Railway, 1845. London, Chatham, etc.
—— Rates and Charges, 1891. London, Chatham, etc.
—— Metropolitan Extension. Minutes of Evidence, 1860. London, Chatham, etc.
—— Meeting at Bristol, 1866. Peto (Sir S. M.).
Cheltenham and Great Western Union Railway Bill, 1836. Minutes of Evidence on. Cheltenham and Gt. Western, etc. Add. 491.
Cheltenham and Great Western Union Railway Company. Cheltenham, 1836.
Cheltenham and Oxford and London and Birmingham Union Railway Company. Cheltenham, 1836.

RAILWAYS (General References): Places—*continued.*

Chesapeake and Ohio Railway. Chesapeake, 1868.

Cheshire Lines Acts, 1883, 1890. Cheshire.

Chester and Holyhead Railway—Britannia and Conway tubular bridge. Britannia, 1849.

—— Report and Memorial. Chester, 1840, 1844.

—— Accidents. Chester and Holyhead Railway Accident, 24th May, 1847, by the falling of the Bridge over the River Dee. Chester, 1847.

Chester and Birkenhead Railway. Evidence before the Lords' Committee. Chester, 1837.

Chicago. Terminal Commission, crossing of streets. Chicago, 1892.

—— Chicago, Milwaukee and St. Paul Railway. Instructions for employees in the Bridge and Building Department. Chicago, 1893.

—— Specifications for wrought iron and steel structures. Chicago, 1888.

Chignecto Marine Transport Railway. Isthmian transit between the Bay of Fundy and the Gulf of St. Lawrence. Ketchum, 1884.

—— Cost, feasibility and advantage of a Ship Railway across the Isthmus of Chignecto. Ketchum, 1882.

Chili. Chili, 1889–92.

—— Victoria to Osorno and Valdivia. Lastarria, 1887.

China. First railway in China. Rapier, 1878.

—— Report on the means of introducing Railway Communication into the Chinese Empire. Stephenson (Sir R. M.), 1864.

Cincinnati and Southern Railway. Progress of Work, and cost of construction, completing and maintaining. Bouscaren, 1878, 1881.

—— Cost of construction. Cincinnati, 1875.

Cincinnati, Wilmington and Janesville Railroad. Reports. Cincinnati, 1857–59.

Cleator and Workington Junction Railway. Classification of Merchandise Traffic and Maximum Rates. Cleator, 1891.

Clydesdale, or upper coal-field of Lanarkshire, Proposed railway to connect it, with the city of Glasgow, etc. Grainger and Miller, 1828.

Cockermouth, Keswick and Penrith Railway. Classification of Traffic and Maximum Rates. Cockermouth, 1891.

Coleorton Railway. Bill. Coleorton, 1883.

Colombia. Compañia Nacional del ferrocarril del Norte. Peña, 1877.

Colonies, Cheap Railways for the. Longridge, 1876.

Connecticut. Reports of the Railway Commissioners of the State of, for 1863, and the Railway Corporations Reports in this State for 1862. Connecticut. Add. 493.

RAILWAYS (General References): Places—*continued.*

Corcovado. Companhia Estrada de ferro, 1884; Passos, 1882. Add. 527.

Cork, Passage and Kinsale Railway. Report on the Proposed. Townsend (R. W.), 1845.

Cornwall. Truro and the Mining district of Perran, in Cornwall. Report on the proposed Railway for connecting. Whishaw (F.), 1831.

—— Perran-Porth to Truro by Perran-Almshouse. Report on the proposed line from. Whishaw (F.) and Thomas, 1831. Report on two proposed lines of Railways between. Whishaw (F.), 1831.

Costa Rica Railroad Company. Contract. Costa Rica, 1867.

—— Interoceanic Railroad through the Republic of Costa Rica. Kurtze, 1866.

Cromer. Eastern and Midlands Railway, Cromer Extension. Bridges and Culverts. Eastern and Midlands, 1887.

Croydon Railway. Plan. Grantham (J.), 1811.

—— London and Croydon and London and Birmingham Railways. Method employed for draining some banks of cuttings and part of the retaining wall of the Euston incline. Hughes (T.), 1845.

Culcairn to Corowa, proposed railway from. Culcairn, 1889.

Danube and Black Sea Railway. Report of Opening, 1860. Danube.

Darjeeling, Himalayan and Ceylon Railways. Comparison of the statistics relating to the construction and working. Waring (F. J.), 1886.

Dartmoor Forest to Plymouth lime quarries. Formation of a Railroad from. Tyrwhitt (Sir T.), 1818.

Dayton and Cincinnati (Short Line) Railroad. Dayton, 1854.

Decauville Portable Narrow Gauge Railway and Rolling Stock. Decauville (P.), 1889, '94. Add. 495.

—— Paris Exhibition of 1889. Decauville.

Delhi. Opening of the Meerut and Umballa Section, 1868. India, p. 118.

Denver and Rio Grande Railway. Specifications. Denver, 1883.

Deptford and Dover Railway. Committee of the House of Commons. Deptford, 1837.

Devon, South, Railway. Address to the Proprietors. Gill (T.), 1848. Sketches. Dawson (W.)

Didcot, Newbury and Southampton Railway. Evidence, etc., on Bill. Didcot.

Dortmund in Prussia, proposed railway from, to Enchede in Holland. Fowler (Sir J.), and Ormsby, 1866.

Dublin and Drogheda Railway. Report on Bill. Dublin, 1836. Report of Directors. Dublin, 1839.

RAILWAYS (General References): Places—*continued.*

Dublin and Drogheda Railway. Reports on the best means of communication between London, Dublin, Edinburgh and Glasgow, 1840–41. Parliamentary..Papers, p. 499.

—— Dublin and Kilkenny Railway. Plans and Sections. Macneill, 1830.

—— Dublin and Kingstown railway. Remarks. Stevenson (D.), 1835–36, p. 251.

—— Correspondence and Papers. Dublin, 1833, 1843.

—— Valuation. Dublin, 1873.

—— Dublin and Wrightsville Railroad Company. Report to Shareholders, 1885. Dublin.

Dundalk Western Railway Company Prospectus, 1837. Dundalk.

Dundee to the valley of Strathmore; projected line of railroad. Dunn (M.), 1825.

Dunedin and Port Chalmers Railway, Correspondence and Engineering Report. Dunedin, 1869, 1870–73. Debates, 1870. Otago.

Düsseldorf. Establishment of Central Station and formation of network of railways. Mulvany (W. T.), 1880.

Eastern Counties Railway Company affairs and policy. Duncan (J.), 1851.

Eden Valley Railway. Station Plans. Bouch; Eden Valley.

Edinburgh, Glasgow and Leith Railway. Reports. Edinburgh, 1831. Report on Railway Bill, 1837. Edinburgh and Glasgow.

Egypt. Garwood, 1883.

—— Communication with India. Egypt, 1857.

—— Suggestions for the formation of railways. Key (A.), 1850.

Ely Valley Railway. Classification of Merchandise Traffic. Ely Valley, 1891.

England. Dammert, 1841; Ferraris, 1881. Return of all lines and branches of Railways in course of construction, 1848. Parliamentary..Papers, p. 499.

—— England. Acworth, 1889.

—— English Railway, 1820–45. Francis (J.), 1851; Michelot and Bousson, 1845.

—— England, 1873. Malézieux, 1874.

—— Our Railways. Pendleton (J.), 1894.

—— English railways—a study. Schwabe (H.), 1872 and 1877.

—— Amalgamation considered as affecting the internal commerce of the country. Anonymous, 1846, p. 40.

—— Recent Construction and Working of Railways, England and elsewhere. Victoria, 1869, p. 377.

RAILWAYS (General References): Places—*continued.*

England. Railway Companies of England—Reply to Observations in the Postmaster-General's Second Report. Stephenson (R.), 1856.

—— Development of Railways in England. McDermott, 1888.

—— Early Western Railroads. Worth (R. H.), 1888.

—— Railway Extension. Lang (G. H.), 1844.

—— Index to our Railway system. Fleming (W.), 1877.

—— Introduction of, England. Anonymous, 1830, p. 41; Dawson (C. J. C.), 1875.

—— Map of England and Wales. Airey, 1890; Bradshaw (G)., 1820; Price-Williams, 1872.

—— Observations of the principal midland counties and north of England. Anonymous, 1838, p. 45.

—— English and American Railroads compared. Dorsey (E. B.), 1887.

—— English and Foreign, Comparative statistics. British Iron Trade, 1885.

—— Express Trains, English and Foreign. Foxwell and Farren, 1889.

—— England, Palestine, Egypt and India, connected by a Railway system. McBean, 1876.

—— What will Parliament do with the Railways? Anonymous (1836), p. 58.

—— Railroad Book of England. Churton (E.), 1851.

—— Railway politics. Cohn, 1874, '83.

—— England and Scotland. Map. Cheffins (C. F.), 1844.

—— The State and the railways. Franqueville, 1880.

—— Our Railway System. Diller, 1886.

—— English Railway Track. Tratman (E. E. R.), 1888.

—— Working of an English Railway. Bonnin (R.), 1890.

—— Working of stations for merchandise in the great towns. Coene, 1875.

—— Works of the great Railways. Cooke (C. J. B.), etc., 1893.

—— Working and Management of an English Railway. Findlay (Sir G.), 1888, '90, '91.

Erie Railway and its connections. Report. Tyler (H. W.), 1874.

Euphrates Valley Railway. Ainsworth (1872); Andrew (Sir W. P.), 1857, 1867, 1870, 1871, 1873.

—— Letter on the importance of its establishment. Selby (Capt. W. B.), 1864.

—— Shortest way to India. Euphrates, 1857, 1871, 1872; Euphrates, Valley Ry., 1856. Add. 499.

—— Strategical importance of. Kuhnenfeld, 1873.

—— Euphrates Railway and Suez Canal. Griffith (C. D.), 1857.

Europe (Central). Map. Potenti, 1846.

RAILWAYS (General References): Places—*continued.*

Europe. Mannsfeld, 1837.

—— Comparative Receipts, 1860 and 1861. Anonymous, 1862, p. 42.

—— Statistics, 1866. Hauchecorne, 1868; 1882. Commission.

—— European and North American Railway Survey. Morton (A. C.), 1851.

Felixstowe and Bawdsey Ferry Railway Act, 1890. Felixstowe.

Festiniog Railway. Classification of Merchandise Traffic. Festiniog, 1891.

—— Report. Molesworth, 1871.

—— Study on, and English Railways. Vignes (E.), 1878.

France. France, pp. 438–440; Lan, Moussette, Bergeron and Dubocq, 1862; Leber, 1878; Milleret, 1841; Nouette-Delorme, 1872; Picard, 1884–5; Reynaud (L.), 1883; Teisserenc, 1839.

—— Cheap Departmental railway. Tellier (C.), 1867.

—— Development. Aucoc (L.), 1875.

—— Fuels used on some railways. Fontenay, 1855.

—— Influence on industrial prosperity. Pillet-Will, 1837.

—— Legislation. Cotelle, 1859–62.

—— Local Railways, Letters to the Amiens Journal on. Savoye (De), 1880. Add. 532.

—— Map of Railways. Hagenbuch, 1847.

—— In time of War. Anonymous, 1872, p. 42.

—— Project for reorganization. Vauthier (L. L.), 1878, 1879, p. 368.

—— —— Bill for regulating the new railway networks. Freycinet (C. de), 1878.

—— Laying out of Railways from Belgium and England to Paris. Vallée (L. L.), 1837.

—— Railways in the North of France, Boulogne, Calais, Dunkerque, Lille and Valenciennes. Paris, p. 460.

—— Calais to Milan, tunnels of the Alps and the Jura. Ladarne, 1889.

—— Ligne du Rhône au Mont Cenis. 1871. Chemin de fer, 1871.

—— Chemin de fer de la Loire. Chemin de fer, 1844. Andrezieux to Roanne. Mellet and Henry, 1828.

—— Chemin de fer du Nord. Electrical Apparatus at the International Electrical Exhibition, 1881. Chemin de fer.

—— Chemin de fer d'Orléans. Decaster *versus* the Orleans Railway Company. Polonceau (C.), 1859.

—— Eastern of France Railway, material and traction. Sauvage (E.), 1891.

—— Opposition to the Railway from Paris to the sea by Gisors. Riant, etc., 1835.

RAILWAYS (General References): Places—*continued.*

France. Establishment of a railway between Paris and Havre. Navier, 1826.

—— Paris to Lyons and the Mediterranean. Compound Locomotives. Baudry, 1889. Ligne du Bourbonnais, rolling stock. Baret, 1859. Dimensions of locomotives and tenders. Chemin de fer, 1869–71.

—— Report to the South Eastern Railway Company on lines projected to connect Paris with the Northern parts of France. Stephenson (R.), 1842.

—— Paris to Orleans. Map. Donnet, 1842.

—— Paris to Strasburg. Graeff, 1861.

—— Poitiers to La Rochelle, Tours to Le Mans, and Nantes to Saint Nazaire. Construction. Morandière (R.), 1858–61.

—— Department of l'Yonne. Larmanjat, 1870.

Furness Railway. Report of Directors, 1891. Furness.

Garnkirk and Glasgow Railway to Port Dundas. Proposed extension, estimate of expense. Grainger and Miller, 1828.

Gateshead, South Shields and Monk Wearmouth. Junction Railway to connect these towns. Brandling, 1835.

Genoa. Genoa, 1862.

Germany. Reden, 1843–46.

—— Statistics. Germany, 1882.

Germany, Belgium and Holland. Report. Samuelson (Sir B.), 1885.

Gippsland and Goulbourn Valley Railways. Minutes. Gippsland, 1877–78.

Girardot Railway. Report and estimate. Cisneros, 1887.

Glasgow Railway. Reports relative to Railway and Tunnel. Glasgow, 1829.

Glasgow to Berwick, proposed Railway. Report relative to. Telford (T.), 1810, p. 287.

Glasgow Central Railway. Minutes of Evidence, Select Committee. Glasgow, 1888.

Glasgow, Paisley, Kilmarnock and Ayr Railway. Minutes of Evidence, 1837. Glasgow.

Glasgow and South Western Railway. Report on Classification of Merchandise Traffic. Glasgow, 1891.

Glasgow Union Railway. Report on the Classification of Merchandise Traffic. Glasgow, 1891.

Golden Valley Railway. Report on the Classification of Merchandise Traffic. Golden Valley, 1891.

Grand Junction Railway Bill, 1833. Grand Junction. Moss, 1838.

Grand Junction or Birmingham, Liverpool and Manchester Railway Guide. Osborne, 1838.

—— Rise and progress. Osborne, 1838.

RAILWAYS (General References): Places—*continued.*

Grand Junction Railway Companion to Liverpool, Manchester and Birmingham. Freeling, 1837, 1838.

—— Grand Junction and Liverpool and Manchester Railway Companies. Cornish, 1837.

Great Britain. Priestley (J.), 1831. Commercial Tariffs, Moussette, 1860.

—— Discussion of the Railway Question. A direct road from John O'Groats to the Land's End. Anonymous, 1825, p. 45.

—— Railway system. Harding (W.), 1848.

—— Station Map. Macaulay (Z.)

Great Britain and Ireland. Anonymous, 1843, 1844, p. 53. Capital and dividends. Chattaway, 1855–56. Junction diagrams. Airey, 1872, 1877, 1888.

—— Railways practically described. Whishaw (F.), 1840.

Great Eastern Railway. Act for making a Railway between London and Cambridge, etc.
Gt. Eastern Rly., 1836. Add. 503.

—— Act for making Eastern Counties Railway, 1836.
Great Eastern.

—— Poll for Directors, Eastern Counties Railway, 1856.
Great Eastern.

—— Prospectus, Maps, etc., Eastern Counties Railway, 1834.
Great Eastern.

—— Report of Investigation Committee, etc., 1849, '55, '56.
Great Eastern.

—— Railway rates, etc., 1891. Great Eastern.

—— Bill, Select Committee, 1887. Great Eastern.

—— Northern Junction Bill, 1864. Great Eastern.

—— Return showing the number of all trains booked to pass over the single line of the Company between Beccles and Coke Oven Junction, Lowestoft and Reedham and Coke Oven Junction, 1861, '71, '81, '91.
Great Eastern Railway, 1892. Add. 503.

See above, Eastern Counties.

Great Leinster and Munster Railway. Act for railway from Dublin to Kilkenny, 1837. Great Leinster.

Great Northern Railway Company. Report.
Gibbs (Joseph), 1835; Mowatt, 1858.

—— Reports, 1889, '90, etc. Great Northern.

—— Rates and Charges Provisional Order, 1891. Great Northern.

—— Specifications for Railway Carriages and Locomotives, 1880–82. Great Northern.

Great Western Railway. Bill. Committee of the House of Commons, 1834. Great Western.

—— —— Mr. Strutt's Observations on, 1847. Strutt (E.).

RAILWAYS (GENERAL REFERENCES): PLACES—*continued.*

Great Western Railway. Brunel's Report to the Directors, and his report on Mr. Wood's Report.
BRUNEL (I. K.), 1838. Add. 488.

—— History with plan and section. BOURNE (J. C.), 1846.

—— Great Western Railway, and other Railways in the South of England. Map.
GREAT Western Railway, 1850. Add. 504.

—— Draft classification of Merchandise Traffic.
GREAT Western Railway, 1890. Add. 504.

—— Minutes of evidence before Lords' Committee, 1835.
GREAT Western Railway.

—— Between Paddington and Maidenhead. Letter and Report.
WOOD (N.), 1838.

—— Plan (Section) of the proposed railway, 1835.
GREAT Western.

—— Rates and Charges Provisional Order, 1891.
GREAT Western Railway, 1891.

—— Smith *v.* G. W. R. Appeal on the suit instituted by the G. W. R. Company to restrain Appellant from excavating minerals from land near Wednesbury. SMITH (E.), 1877, p. 211; SMITH (Edward), 1877. Add. 533.

—— and the Wednesbury Coal Mines. Reports and Correspondence relating to. WEDNESBURY Coal Mines, 1875.

—— Companion to Windsor, Eton, and Virginia Water.
FREELING, 1840.

Greenwich (London and) Railway Bill, 1833.
LONDON and Greenwich.

—— Failure in piers, 1836. LONDON and Greenwich.

Guimaraens Railway Company and John Dixon, late contractor of the Minho District Railway Company.
VELLOSO (A. de M. S.), 1883.

Guisely, Yeadon and Rawdon Railway. Minutes of Evidence on Railway Bill, 1885. GUISELY.

Halesowen and Bromsgrove Branch Railways. Plan and section.
HALESOWEN, Add. 505.

Halifax and Quebec Railway. Report upon the surveys, routes, and estimates. LIGHT, 1861.

Hambantota and Uva Railway, Proposed.
RUTHERFORD (H. K.), 1879.

Hartford and New Haven Railroad. Iron Bridge over the Connecticut River. ELLIS (T. G.), 1866.

Harwich Railway Company. Report. HOSKING, 1844.

Hertfordshire Grand Union Railway. Report on proposed line between the Northern Railway and the London and Birmingham Railway. WHISHAW (F.), 1836.

Highland Railway. Bridges and Viaducts. HIGHLAND, 1864.

—— Construction and works. MITCHELL (Joseph), 1867.

—— Return as to running of "mixed" trains. HIGHLAND, 1891.

RAILWAYS (General References): Places—*continued.*

Holkar State Railway. Cheyne (C.), 1878.

Holland. Holland Railway, 1884–5. Holland.

—— Dutch International Railway from Amsterdam, Scheveningen and the Hague to Almelo and Scheveningen Harbour. Scheveningen, 1866.

—— Utrecht to Lattrop. Estimates for the acquisition of land. Marchal and Wiart, 1856.

Honduras Railway. Honduras, 1872.

Honduras and the Inter-Oceanic Railway. Brooks (W. A.), 1874.

Honduras Interoceanic Railways. Reports, etc. Squier (E. G.), 1854–57.

See also Atlantic and Pacific.

Hounslow and Metropolitan Railway Act, 1883. Hounslow.

Hull Railways, History. Macturk, 1880.

Hull, Barnsley, and West Riding Junction Railway, Geology. Cole (E. M.), 1886.

—— Report, 1879. Hull.

Hull, Lincoln and Nottingham Railway Prospectus, 1836. Hull.

Hull and Lincoln Railway Bill, 1883. Hull.

Hull and Selby Railway Act, 1836. Railway Bill, 1836. Hull.

Hull South and West Junction Railway Bill, 1873. Hull.

Hungary, 1868–78. Hungary.

—— Respective uses of Railroads and Waterways, 1892. Halasz.

Illinois Central Railroad Report. Illinois, 1856.

—— Examination of the Value of the Bonds of. Walker (Robert J.), 1851.

India. Clarke (H.), 1857; Davidson (E.), 1868; Furnivall, 1884; Grant (C. W.), 1850; India, 1845, '48, '55, 1859–83, pp. 105–6; Murray (A. G.), 1877; Vincent (C), 1884.

—— Indian Railway Act, 1879. General Rules. India, p. 105.

—— Reasons why the Baroda Goods terminus should not be at Colaba. Ormiston, 1867.

—— Assisted Railways, 1884. India, p. 104.

—— Beitkul (Sedashegur), Dharwar, and Bellary Railway. Report and Proposal. Latham (G.), 1862.

—— Proposed railway in Bengal, 1853. India, p. 110.

—— Railways of Eastern Bengal, 1861. India, p. 110.

Indian, Great, Peninsular Railway. Map of the Bhor Ghát Incline on. West (A. A.), 1866.

—— Bombay, Baroda and Central India Railway. Report. Kennedy (J. P.), 1872.

—— Indian Railways and British Trade. Hallett (H. S.), 1889.

RAILWAYS (General References): Places—*continued.*

Indian, Peninsula Railway, Great. Communication between India and Upper Burma. Babbage (H. P.), 1890.

—— Extension in India and Burmah. Hallett (H. S.), 1889.

India. Coals, Indian, as fuel. Danvers, 1867.

—— Colonies, India and the. Cheap Railroads in connection with the Traction Engine and Endless Railway. Hemming, 1857.

—— Committee of Locomotive and Carriage Superintendents, Proceedings. India, p. 106.

—— Communication in India, 1846, 1868–69, 1884. India, pp. 106–7.

—— Comparative statement of construction, cost, receipts, working charges, and net earnings, 1871–74. Baynes.

—— Connected with British empire in the East. Andrew (Sir W. P.), 1884.

—— —— Papers relating to a railway to connect India and Ceylon. India, 1894. Add. 510.

—— Construction, Railway, 1853, '71. Doyne, 1860; India, p. 104.

—— Constructed and in progress, 1885. India. Add. 510.

—— Control of Indian Railways, 1885. India, p. 104.

—— Delhi line at Deobund to Roorkee, Hurdwar and Dehra. Proposed branch railway from the. Campbell (A.), 1868.

—— —— Necessity of placing Delhi and Lahore in railway communication with Kurrachee, 1865. India, p. 120.

—— East Indian Railway Bill. Report of Select Committee, 1879. India, p. 106.

—— East Indian Railway Company. Contract No. 2, for the extension of the experimental line of railway to Delhi, 1854. East India Company.

—— —— Map, 1846. India, p. 105.

—— —— Opening, 1855. India, p. 106.

—— East Indian and Great Western of Bengal Railways, position and prospects, 1847. India, p. 105.

—— East Indian Railway Contracts for railway from Calcutta to Upper Provinces, 1849, '54. India, p. 104.

—— East Indian Railway and Imperial State Railways, 1881–83. India, p. 105.

—— East Indian and Guaranteed Railways, 1884. India, p. 105.

—— Extension, Railway. Forde (A. W.), 1884; India, 1869, p. 105; Kennedy (J. P.), 1874.

—— Finance, Indian Railway. Kennedy (J. P.), 1875.

—— Gauge considered in relation to the bulk and weight of goods to be conveyed. Kennedy (J. P.), 1872.

—— —— List with gauges and lengths, 1883. India, p. 104.

RAILWAYS (General References): Places—*continued.*

India. Gauge. Break of Gauge in India. India, p. 104.
—— —— Most suitable gauge for Narrow Gauge Railways. India, p. 104.
—— —— Break of Gauge on the Railway to Peshawur. India, p. 105.
—— —— Relative merits of Broad and Metre Gauge Lines of Railway, 1888. India, p. 106.
—— —— State Railways, 1873. India, p. 106.
—— —— Narrow gauge railways. Fowler (Sir J.), 1870; Hawkshaw, 1870.
—— Guaranteed Railways, 1881–84. India, p. 105.
—— —— Non-guaranteed Railways, 1882. India, p. 105.
—— Indo-Burma-China Railway Connections. Anonymous, 1888. Add. 481.
—— Proposed railway to connect Indore and Southern Malwa with the G. I. P. Railway, 1891. India, p. 120.
—— Indus Railway, 1867. India, p. 106.
—— —— Completion of the railway system of the Valley of the Indus. Andrew (W. P.), 1869.
—— Introduction. Bourne (J.), 1848.
—— Introduction of Railways into India upon the English plan. Merrall, 1860.
—— Jamboosur to Broach, Construction of a Railway from, 1865. India, p. 113.
—— Lengths, age and working, 1876–80. India, p. 105.
—— Management. Clarke (H.), 1847.
—— Memorandum to Sir Salar Jung Bahadoor. Johnston (T. M. H.), 1871.
—— Military Transport. Ross (D.), 1879, 1883.
—— Indian Railway network in 1884. Haughton (B.).
—— Nizam's State Railway. Stone (E. H.), 1876.
—— Notes on the Railway to India. Austin (C. E.), 1878.
—— One-rail railway. Haddan (J. L.), 1871.
—— Oude and Rohilkund Railway. Bill to empower the Secretary of State to purchase, 1888. India, p. 104.
—— Policy, Indian Railway. Bell (H.), 1894. Add. 485; Ward (James), 1847.
—— Poorer districts to provide for themselves the benefits of railway intercourse. Kennedy (J. P.), 1849.
—— Report on the practicability and advantages of the introduction of Railways. Stephenson (Sir R. M.), 1845.
—— Rajputana-Malwa Railway. Railway Location and Working considered financially. Hogan, 1890.
—— Railway Communication between Rangoon and Western China, 1865. India, p. 130.

RAILWAYS (General References): Places—*continued.*

India. Reports, 1884. India, p. 105.

—— Rolling Stock. Heppel, 1868.

—— South Indian Railway Company. Specifications for Bridge work, Roofing, Steel Rails, etc. South Indian Rly. Co., 1884–87.

—— Speech on Indian Railways in House of Commons, Aug. 16th, 1894. Kitson (Sir J.). Add. 514.

—— State Railways in India. Molesworth, 1872. Administration Reports, 1879–80, etc. India, p. 104. Contracts for ironwork, 1883, '84, '89. India, p. 105. Imperial, 1884. India, p. 106. In Native States, 1881–84. India, p. 106. Constructed and in progress, Dec., 1882. India. Add. 510. Provincial, 1881–84. India, p. 106.

—— Statistics, 1880. India, p. 106.

—— Thul Ghaut Rly. Incline. Great India Peninsula Rly. Photograph illustrating progress of work. India, 1865. Add. 510.

—— Traffic. Login, 1866, '67, '69.

—— —— Rail transit *versus* river transit. Anonymous, 1856, p. 58.

—— Upper India. Medley, 1884.

—— Valley, Indus, Railway. Collins (J.), 1866.

—— Waterways or Railways. Tyrrell (F.), 1874.

—— Proposed England and India Railway. Low and Thomas, 1871.

Innsbruck to Bozen. Austria, 1872.

—— Brenner Pass. Austria, 1868.

Inverness and Glasgow Railway, proposed. McBean, 1874–75.

Ireland. Consolidation of Irish Railways, 1867. Ireland, p. 142.

—— Railways in. Vignoles (C. B.), 1842.

—— Railways (Ireland) Act, 1889. Orders in Council. Ireland, p. 142.

—— Barrack Bridge terminus through Dublin to Kingstown Harbour. Mode by which it is practicable to extend them. Vignoles (C. B.), 1838.

—— Irish Railway Bills. Minutes of Evidence taken before Select Committees of the House of Lords. Ireland, 1865. Add. 511.

—— Proposed railway between the City of Cork and the town of Cove. Macneill, 1837.

—— Railway Communication from Dublin to the North of Ireland. Lindsay (H. L.), 1845.

—— Railway Engineering, Ireland. Cotton (C. P.), 1861.

—— Financial system for extending Railways in Ireland. Low (W.), 1850.

RAILWAYS (General References): Places—*continued.*

Ireland. Great Northern. Report on Hours of Labour, etc., 1894. Great Northern Rly. of Ireland.

—— Report of Inquiry relative to the condition of the line and rolling stock, insufficiency of the accommodation and the inadequacy of the train service.
Gt. Northern Rly. of Ireland, 1892. Add. 504.

—— Irish Great Western Railway. Evidence before Select Committee. Irish G. W. Rly.

—— Proposed Railway between Limerick and Waterford.
Nimmo, 1825.

—— Irish Railways (Loans), 1872. Ireland, p. 142

—— Observations on the report of the Board of Trade on railways proposed to be made in Ireland westward of Dublin. Mullingar, Athlone, and Longford Rly., 1845. Add. 521.

—— Projected in 1844. Doran.

—— S. and S.W. Districts. Report on the several lines of Railway through. Vignoles (C. B.), 1837.

—— Reports of Commissioners, 1837–38, 1868.
Ireland, pp. 142–3.

—— Royal Commission. Evidence and Papers, 1866–68.
Ireland, p. 142.

—— State purchase. Findlay (Sir G.), 1886; Hancock (1867).

—— Waterford and Wexford Railway Company, present position.
Flood, 1873.

—— Working Acceleration of the Irish Mail Trains.
Galt (W.), 1884.

Isle of Wight Railway Bill. Reports from Select Committee.
Isle of Wight, 1890.

Italy. Italy, p. 147, 148.

—— Economic service of secondary lines. Benazzo, 1880.

—— Use of Bessemer steel. Imperatori, 1878.

—— Southern Italy. Società Italiana per le Strade, etc., 1879.

—— Railway between Italy and Genoa. Picturesque scenery.
Bossoli, 1853.

Japan. Imperial Government Railways. Tokio-Takasaki Section, Proposed crossing of the Toda Gawa. Holtham, 1881.

Kent. Advantages of direct Inland Communication through Kent, Surrey, Sussex and Hants. James (W.), 1823.

—— Board of Trade and the Kentish Railway schemes.
Board of Trade, 1845.

—— Central Kentish Railway. Central Kentish Rly., 1836. Report. Rennie (G. and J.), 1837.

—— Kent Railway, compared with the South Eastern as to tunnels, levels, distances and population.
Kent Railway, 1836.

RAILWAYS (General References): Places—*continued.*

Keokuk and Kansas City Railway, Missouri, U.S.
Younghusband (O.), 1875.

Knaresborough Railway. Report, 1818. Knaresborough Railway.

La Dorada. Report, contracts, estimates, etc. Cisneros, 1887

Lancashire and Penrith proposed Railway. Report.
Whishaw (F.), 1840.

Lancashire and Yorkshire Railway. Blackburn Collision. Blackburn, 1882. Report, 1886. Lancashire and Yorkshire Rly.

—— Report on Rolling Stock and permanent way.
Hawkshaw, 1850.

Lausanne to Echaltens local railway.
Brunner, 1877.

Lausanne and Ouchy Railway. Pneumatic railway from Lausanne to Ouchy, 1871. Lausanne and Ouchy Rly.

Leeds. Railway schemes in Parliament in 1864.
Filliter, 1864.

Leeds and Hull Junction Railway. Report to the subscribers for a survey of the part between Hull and Selby.
Walker (James), and Burges, 1834.

Leeds to Selby, proposed Railway. Report to the Committee.
Walker (James), 1829, p. 394.

—— Utility of a Railway from Leeds to Selby and Hull.
Hill (T.), 1827.

Lehigh Valley Railroad. Reports, 1866–68. Lehigh Valley.

Leicester and Swannington Railway. Bill for execution of additional works, 1833. Leicester. Notes. Stretton (C. E.), 1891.

Leinster and Munster Railway. Prospectus, 1836. Leinster.

Leipzig-Dresden. Opening. Leipzig, 1837.

Le Mans to Angers. Geological profile. Mille and Thoré, 1863.

Limavady and Dungiven Railway. Report on the Classification of Merchandise Traffic. Limavady, 1891.

Limerick and Waterford Railway. Description of the Main Line.
Limerick, 1850.

—— Proposed Railway. Expenditure, revenue and advantages.
Smyth (G. L.), 1836.

Listowel and Ballybunion Railway. Report on the Classification of Merchandise Traffic. Lisbon, 1891.

Liverpool. Grantham (J.), 1858.

Liverpool and Birmingham Railway. Claim of the Subscribers to an Act of Parliament, 1825. Liverpool and Birmingham.

—— High Level Railway. Improvements in working.
Grantham (J.), 1853.

RAILWAYS (General References): Places—*continued.*

Liverpool and Manchester Railway. Anonymous, 1832, p. 54; Booth (H.), 1831. Acts, 1826, '28, '31. Liverpool and Manchester. Bill, 1824, '25, '26. Liverpool and Manchester.

Liverpool to the Manchester, Bolton, and Bury Canal. Two reports on the projected Line of Railway from. Vignoles (C. B.), and Locke, 1835.

Liverpool and Manchester Railway. Chat Moss. Bailey (W. H.), 1889.

—— Coloured views. Bury (T. T.), 1831.

—— Comparative merits of locomotive and fixed engines. Rastrick, 1829.

—— Account of opening. Walker (James S.), 1831.

—— Railway between Liverpool and Manchester necessary. Letter. Sandars (J.), 1824.

—— Observations. Stevenson (D.), 1835–36, p. 251.

—— Reports with observations, etc. Telford (T.), 1829, p. 288.

—— Weight of the rails; chairs and fastenings, etc. Barlow (P.), 1837.

London. London Railways, 1867. London, p. 264; Development. Kemmann, 1892.

—— London and Blackwall Railway. Prospectus, 1834. Advantages of the Railway, 1837. London and Blackwall.

—— Mile End Old Town. Report of the Surveyor. Knight (J. M.), 1874.

—— Remarks on the projected London Railroad and Canal. Tatham (W.), 1803.

—— East and West Metropolitan Junction and Cannon Street Railway. Haywood (W.), 1873, p. 32.

—— Central London Railway Act. Petitions, Minutes, etc., 1890. London, p. 264.

—— Construction of station fronting the Mansion House. Haywood (W.), 1893, p. 32.

—— Minutes of Evidence, 1889. London Central.

—— City Improvements and Railway Termini. Pearson (C.), [1851?]

—— Proposed City Union Railway. Allen (E. E.), 1878.

—— Proposed London Railway to afford direct railway communication between the City and Westminster and all the Western suburbs. Parsons (P. M.), 1853.

—— Reports on projects of Railway Companies, 1860, '61, '74–'77. Haywood (W.), p. 32.

—— Projected Railways to the East and West India Docks and Blackwall. Commercial Docks, 1835.

RAILWAYS (General References): Places—*continued.*

London. East London Railway. Classification of merchandise traffic. East London Railway, 1891. Reply to Sir E. Watkin's Circular. Grant (A.), 1878.

—— Electric and Cable Railway, 1892. London, p. 265.

—— Electric Railway Bills in Parliament, 1892. Report. London, p. 265.

—— Report on Railway Extensions, 1873. London, p. 265.

—— Traffic with regard to Railways. Kemmann, 1892.

—— Hungerford Market to London Bridge. View of the proposed line of Railroad along the banks of the Thames. Trench (Sir F. W.), 1841.

—— Inner Circle Completion and Eastern Extension Railway Bill. Haywood (W.), 1874, p. 32.

—— —— Report of Parliamentary Committee, 1873. London, p. 264.

—— —— Report of Meeting of Common Council, 1874. London, p. 264.

—— —— Report, 1874. London, p. 265.

—— —— Completion of Inner Circle, 1873. London, p. 265.

—— —— Resolution of Board of Works upon Contribution, 1874 London, p. 265.

—— Metropolitan Railway Communication. Third Report of Committee, 1863. London, p. 264.

—— Metropolitan District Railway Bill. Minutes of Evidence, 1883. London, p. 264.

—— Metropolitan District Railway. Opening of the line from Blackfriars Bridge to the Mansion House. Smiles (R.), 1871, p. 209.

—— Metropolitan District Railway Bill. 1883. District Railway, 1883.

—— Metropolitan and District Railways Companies Act, 1879. Haywood (W.), p. 32.

—— Metropolitan District Railway Bill. Minutes of Evidence, Metropolitan, 1870, 1879.

—— —— Prospects, 1875. Metropolitan.

—— —— Reports, Proceedings at Meetings, etc., 1872–75. Metropolitan.

—— —— Classification of Merchandise Traffic, 1891. Metropolitan.

—— Metropolitan Railway Company *v.* John J. Jackson. (Appeal against damages awarded to J. J. J. for injuries received while travelling on the Railway.) Metropolitan Railway Company, 1877. Add. 520.

—— Metropolitan Railways Map. Stanford (E.), 1878.

—— Plans of the North Metropolitan Railway. Pennethorne (J.), 1854.

RAILWAYS (General References): Places—*continued.*

London. Station Map of the Metropolitan Railways. Macaulay (Z.).

—— Metropolitan railways and means of transport of London, New York, Paris, etc. Sérafon (F.), 1872, 1885, pp. 183 and 184.

—— London and Mid-Western Railway. Clark (D. K.), 1853.

—— Act for making a Railway from the Minories to Blackwall. London, p. 264.

—— Commercial Railway from the Minories to Leadenhall Street. Commercial Railway, 1837.

—— Railway communication from London to the North. Maps and Sections. Cheffins (C. F.), 1840.

—— Regent's Canal, City and Docks Railway. Regent's Canal, 1882, 1885.

—— Reports. Bazalgette (Sir J. W.), 1864, 1867, pp. 108, 109.

—— Station between Seething Lane and Trinity Square. Ventilation. Haywood (W.), 1882, p. 32.

—— Railway System of London. McDermott, 1891.

—— Railways terminating in London. Rea, 1888.

—— Railway Communication in London and the Thames Embankment. Lane (C. B.), 1861.

—— Thames Embankment Railway. Page (T.), 1854.

—— Ventilation of Railways Bill, 1883. London, p. 264.

—— Westminster Terminus Railway Bill. Page (T.), 1854.

—— Westminster Terminus Railway. Pennethorne (J.), 1854.

—— Workmen's Trains on Metropolitan Lines. Report, 1883-Statements, 1890. London, p. 265. Note of a Conference in June, 1893. London. Add. 516.

Londonderry Railway Report on Classification of Merchandise Traffic, 1891. Londonderry.

Lothians. Midlothian Coalfields to Edinburgh and Leith. Report on the various lines of Railways. Stevenson (R.), 1819.

—— Midlothian Coal Fields to Rivers Tweed and Leader. Proposed Railway. Report. Stevenson (R.), 1821.

—— East Lothian Railway. Report of a survey. Stevenson (R.), 1825.

Louisville and Nashville Railroad. Reports, 1873–76. Iron Mountains and Coal Basins of Alabama, 1875. Louisville and Nashville.

Luxemburg, Great, Railway. Report, 1846. Luxemburg Railway.

Macahé and Campos. Companhia Estrada de ferro, 1885–7.

Madras. Reports of Railway Department, 1855–57, '60. India, pp. 124–5.

RAILWAYS (General References): Places—*continued.*

Madras. Scale of Passenger Fares and Goods Traffic, 1856–57. India, p. 124.

Madrid and Valencia Railway. Report, 1846. Manby (E. O. and J.).

Madrid to Zaragoza and to Alicante. Compañia de los Ferrocarriles, 1887.

Magpie Creek Railway. Report, 1878. Magpie Creek.

Mahratta Country. Hyderabad and Sedashegur Railway, 1858. India, p. 126.

Maidstone and Ashford Railway Bill. Special report from the Select Committee, 1880. Maidstone and Ashford Rly. Add. 518.

Manchester, London and, Railways. Mulock, 1845.

Manchester. Reasons in favour of a direct line of Railroad from London to Manchester, 1846. London and Manchester.

Manchester and Bolton Railway to the N. end of Liverpool. Report on the proposed Line of Railway from. Walker (James) and Burges, 1835.

Manchester and Cheshire Junction Railway. Minutes of Evidence, 1836. Manchester and Cheshire.

Manchester, Huddersfield, and Great Grimsby Railway. Copy of Bill, 1846. Manchester, Huddersfield, etc.

Manchester and Leeds Railway. Prices at which contracts were executed. Manchester and Leeds, 1833.

—— Report of Board of Trade on the projected railway. Manchester and Leeds, 1845.

Manchester and Sheffield Railway Luggage Engine "Atlas." Beyer, 1848.

Manchester, Sheffield and Lincolnshire Railways Assessment 1874, Acts 1879–90. Manchester, Sheffield, etc.

—— Railways and Agriculture in North Lincolnshire. Notes of a ride over the track. Manchester, Sheffield and Lincolnshire and other railways. Sidney (S.), 1848.

Mansfield and Southwell Railway. Bayliss, 1872.

Marylebone to Waltham Abbey and Moorfields Canal. Report and survey of a line. Whitworth (R.), 1773, '74.

Maryport and Carlisle Railway. Report, 1889–91. Maryport and Carlisle.

Massachusetts. Quincy, 1866.

—— Reports of the Board of Railroad Commissioners, 1870, etc. Massachusetts.

Mauritius. 1869 Report. Mauritius.

Melbourne and Hobson's Bay Railways. Return, 1878. Melbourne.

Merionethshire Railway Act, 1879. Merionethshire.

Mersey Railway. Fox (Sir D.), 1883.

RAILWAYS (General References): Places—*continued.*

Michigan Central Railroad Company. Switch Layouts. Michigan.

Midland Counties Railway. Report. Rennie (G.), 1833.

Midland Railway. Accidents. Letter of Board of Trade, 1881. Midland Railway.

—— Rise and progress. Williams (F. S.), 1876.

—— Rates and Charges, Provisional Order, 1891. Midland Railway.

—— Specifications for Railway Carriages and Locomotives, 1880-81. Midland Railway.

Midland and Great Western Railway Companies Clifton Extension Joint Railway. Report on Classification of Merchandise Traffic, 1891. Midland Railway.

Mississippi and Missouri Railroad Company, Ward *v.* Judd (N. B.) and Campbell, 1850.

Modane and Bardonnêche, Tunnel of the Alps between. Maus, 1850.

Mohawk and Hudson Railroad Co. First Steam Railroad Passenger Train in America. Mohawk and Hudson, 1870.

Montrose and Brechin Iron Railway. Report relating to. Stevenson (R.), 1819.

Morpeth and Edinburgh Road. Report. Morpeth, 1822.

Mossel Bay, George, and Oudtshoorn Railway. Report. Spindler (H. L.), 1880.

Mulhausen to Thann, 1855. Grosseteste, 1889.

Nagpur and Chhattisgarh Railway. Album of Photographs. MacGeorge, 1882.

—— Note, 1882. Photographic Views, 1882. India, p. 126.

Namur and Liége Railway. Report, 1846. Namur and Liége.

Nelson. East and West Coast and Nelson Railway. Report. Blair (W. N.), 1886.

Newcastle and Carlisle Railway. Report, 1825. Newcastle and Carlisle.

Newcastle, Edinburgh and Glasgow Railway. Report. Richardson (Joshua), 1837.

Newcastle to Morpeth to be called the Northumberland Railway. Prospectus. Dunn (M.), 1835.

—— Observations on the proposed Railway from Newcastle to North Shields. Richardson (Joshua), 1831 and 1834.

New South Wales. Railway from Bowral or Moss Vale to Robertson. Bowral, 1888.

—— Railway from Cootamundra to Temora. Cootamundra, 1890.

—— Goulburn to Crookwell. Goulburn, 1889.

—— Grafton to the Tweed. Grafton, 1890.

RAILWAYS (GENERAL REFERENCES): PLACES—*continued.*

New South Wales. Railway Guide. RICHARDS (T.), 1879.

—— Illawarra Railway at Stanwell Park. Treatment of the slips on it. SHELLSHEAR (W.), 1890.

—— and India. DENISON, 1864.

—— Proposed extension of the Railway from Kiama to Nowra into the town of Nowra. KIAMA, 1891.

—— Construction of Railways to Longnose Point, 1889. LONGNOSE Point.

—— Proposed railway from Molong to Parkes and Forbes. MOLONG, N.S.W., 1890.

—— Narrabri to Moree, proposed Railway, Report, plans, etc. of. NEW SOUTH WALES, 1894. Add. 522.

—— Proposed Railway from Moss Vale to Robertson. MOSS VALE, 1890.

—— Proposed Railway from Mudgee to Gulgong. MUDGEE, 1890.

—— Time-Tables, etc., regarding the Government Railways, 1892. NEW SOUTH WALES, p. 404.

—— Reports of Railway Commissioners, 1889–90. NEW SOUTH WALES, p. 402.

—— Gradients on New South Wales Railways. NEW SOUTH WALES, 1894, p. 402.

—— Reports on origin, construction, and working, 1846–76. NEW SOUTH WALES, p. 403.

—— Report of Commissioner of Railways and Tramways, 1883, etc. NEW SOUTH WALES, p. 403.

—— Railway Differential Rates. NEW SOUTH WALES, 1888, p. 403.

—— Lines and Works of Construction, 1876. NEW SOUTH WALES, p. 403.

—— Construction of Railway works, 1860. NEW SOUTH WALES, p. 403.

—— Guide, 1879. NEW SOUTH WALES, p. 403.

—— Correspondence on subject of Rails, 1875. NEW SOUTH WALES, p. 403.

—— Charges of W. F. Schey against E. M. G. Eddy, 1892. NEW SOUTH WALES, p. 403.

—— Inferior Iron obtained from England, 1875. NEW SOUTH WALES, p. 403.

—— Railway Extension Contracts, 1860. NEW SOUTH WALES, p. 403.

—— Petitions for Railways, 1867. NEW SOUTH WALES, p. 403.

—— Proposed extensions to Wagga Wagga, Orange and Tamworth Railways. Rails, 1873. NEW SOUTH WALES, p. 403.

RAILWAYS (General References): Places—*continued.*

New South Wales. Condition of the Rolling Stock. Reports, 1889. New South Wales, p. 403.

—— Brakes, efficiency of the Westinghouse and vacuum continuous brakes for goods trains. New South Wales, 1891, p. 403.

—— Railways in course of construction, 1878. New South Wales, p. 404.

—— Proposed Railway from Kiama to Nowra, 1890. New South Wales, p. 404.

—— From Nyngan to Cobar, 1890. New South Wales, p. 404.

—— Trial Surveys for future extension, 1874, 1883–84. New South Wales, p. 404.

New York. Arcade Railway, 1868. New York City. Compared with the Underground Railways of London. McAlpine, 1884.

—— New York and Brooklyn Bridge Cable Railway. Leverich, 1888.

—— Traffic capacity. Leverich, 1889.

—— New York Central and Hudson River Railroad. Reports, 1889, etc. New York Central.

—— Cheapest railroad in the world. Pew (A.), 1890.

—— Elevated Railway, 1878. New York City; Pontzen, 1884.

—— New York, Lake Erie, and Western Railroad. Reports, 1855, etc. Specifications for Iron Bridges, 1879. New York, Lake Erie. Committee on Railroads on the petition of the president, directors and company. New York and Erie Ry., 1838. Add. 523.

—— Local steam transit routes in the 23rd and 24th wards. New York City, 1877.

—— New York and Massachusetts railroads, statistics of cost and traffic. Morton (A. C.), 1849.

—— New York Metropolitan. Banderali, 1886.

—— New York and Newhaven Railroad. Report of Directors, 1856. New York and Newhaven.

—— Rapid Transit. Reports. New York City, 1870, '84, 91.

—— Rapid Transit and its effect upon Broadway Real Estate. Mines (J. F.), 1884.

—— Reports of Railroad Commissioners and State Engineer, 1855–77. New York State.

—— Report of Railroad Companies, 1856. New York State.

—— Report of Committee on Railroads to investigate alleged abuses, 1880. New York State.

—— Accidents. Report of Committee, 1852. New York State.

—— Terminal Facilities for handling freight of the Railroads entering the port of New York. Mordecai (G.), 1885.

RAILWAYS (General References): Places—*continued.*

New York. The Railway War. Competition, combination, or regulation? Anonymous (1881), p. 54.

New Zealand. Report of the Commission on the Railways of Auckland. Auckland, N.Z. (1877).

—— Reports, 1861–68. Canterbury, N.Z.

—— Little River and great Southern Railways, 1861–68. Canterbury, N.Z.

—— Provincial contribution to the Canterbury Branch railways. Canterbury, N.Z., 1872.

—— Nelson to the West Coast. Nelson, N.Z., 1868, '75.

—— Tapanui branch Railway. Report. Tapanui, N.Z., 1878.

—— Waitepeka Railway, construction of. Waitepeka, N.Z., 1874–5.

—— Working narrow-gauge Railways with light traffic. Maxwell, 1891.

—— Reports, 1870. New Zealand, p. 411.

—— Papers relating to Construction. Reports, 1871. New Zealand, p. 411.

—— Memorandum and Reports, 1872–73. New Zealand, p. 411.

—— Railway Returns, 1877. New Zealand, p. 411.

—— Reports, Regulations, etc., on Railway Management, 1876–77. New Zealand, pp. 411–412.

—— Report on Working Railways, 1892. New Zealand, p. 412.

—— Light Railways. Construction, 1870. New Zealand, p. 411.

—— Branch Railways. Reports, 1875, '76. New Zealand, pp. 411, 412.

—— Nelson and Cobden Railway (proposed), 1870. New Zealand, p. 411.

—— Great Central Trunk Railway. Report, 1872. New Zealand, p. 411.

—— Malvern Hills Railway. Connection of the Oxford line, 1875. New Zealand, p. 411.

—— Hutt-Waikanaie Railway. New Zealand, p. 412.

—— Canterbury and Otago Provincial Railways. Valuation. New Zealand, p. 412.

—— North Island Trunk Railway. Report, 1884. New Zealand, p. 412.

—— Main and Coal Field Lines of Railway (proposed). New Zealand, p. 411.

—— Estimated Revenue from Railways in each province, 1876–77. New Zealand, p. 411.

—— Carriages. Cost, 1877. New Zealand, p. 412.

—— Establishment of a Railway Waggon Company, 1878. New Zealand, p. 412.

—— Rolling Stock Contracts, 1878. New Zealand, p. 412.

RAILWAYS (General References): Places—*continued.*

New Zealand. Railways proposed and authorised in North and Middle Islands, 1878. New Zealand, p. 412.

—— Railway lines in northern districts of South Island. New Zealand, p. 412.

—— Carriages. Defective Railway Waggons, 1880. New Zealand, p. 412.

—— Inclines. Steep incline at Arthur's Pass, 1892. New Zealand, p. 412.

Niagara Falls Marine Railway. Report. Talcott (W. H.), 1864.

Nicaragua. Railway. *See* Atlantic and Pacific, Junction of.

Nipissing and James' Bay Railway. Bailey (J. C.), 1884.

North British Railway. Accidents. Letter of Board of Trade, 1881. Midland Railway. Report on Classification of Merchandise Traffic, 1891. North British Rly.

North Eastern Railway. Report on Classification of Merchandise Traffic, 1891. North Eastern Rly.

North Kent Railway. Evidence before Select Committee, 1845. North Kent Rly.

—— Section showing the method of supplying London with spring Water. Barlow (P. W.), 1850.

North Staffordshire Railway Accident near Harecastle Station, 1889. North Staffordshire Rly. Working models of the rolling stock. Cheffins (C. E.).

—— Reports, 1884–87. North Staffordshire Rly.

—— Classification of Merchandise Traffic. Report, 1891. North Staffordshire Rly.

North Western Railway. Appeal. (Radley and Bramall *versus* L. and N. W. Rly.). Radley (Rev. T.) and Bramall, 1875. Add. 529.

—— Rides on railways in Cumberland, Wales, etc., with a map of the N. Western Railway and branches. Sidney (S.), 1851.

—— Stokers and Pokers. London and N. W. Rly., 1849. Add. 516.

—— Proposed railway to Birmingham, 1830, '31. London and North Western, p. 276.

—— Minutes of Evidence before the Lords Committees, 1832, Act 1833. London and North Western, p. 275.

—— Minutes of Evidence respecting Railway to join London and Birmingham Railway at or near Regent's Canal, 1836. London and North Western, p. 275.

—— London and Birmingham Railway Bill. Minutes of Evidence, 1839. London and North Western, p. 275.

—— Act for making railway from London and Birmingham Railway to Northampton and Peterborough, 1843. London and North Western, p. 275.

RAILWAYS (General References): Places—*continued.*

North Western Railway. Handbook for London and Birmingham Railway, 1838, 1840. London and North Western, p. 275.

—— Map of London and Birmingham Railway from London to Boxmoor, 1837. London and North Western, p. 276.

—— Classification of Merchandise Traffic, 1890, '91. London and North Western, p. 276.

—— Locomotive Sub-Committee, Southern Division, 1854. London and North Western, p. 276.

—— Soho, Handsworth and Perry Barr Junctions. Specification of Works. London and North Western, p. 276.

—— Time Table for Enginemen and Guards. Southern Division and branches, 1857. London and North Western, p. 277.

—— Rates and Charges. Provisional Orders, 1891. London and North Western, p. 277.

—— Report of Commissioners respecting Railway Communication between London and Birmingham, 1847. London and North Western, p. 276.

—— Description of Railway, by Sir F. Head, 1849. London and North Western, p. 276.

Northern Pacific Railroad. Memorial, etc., 1867. Resources and merits, 1868. Prospectus for Emigrants, 1882. Northern Pacific Railroad.

Northern and Eastern Railway Company. Prospectus, 1835. Report, 1836. Northern and Eastern.

Norway. Norway, 1878.

—— Norwegian Western and Drammen-Skien Ry. Erichsen, 1877.

—— —— 3 feet 6 inches gauge railways. Pihl (C.), 1875.

Nottingham, Stamford and Huntingdon (proposed). Addy, 1882.

Nova Scotia International Coal and Railway Company, 1867. International C. and R. Co.

Nova Scotia. Report, 1862, '66. Nova Scotia.

Ohio. Annual Report of the Commissioner of Railroads, 1867–77. Ohio. Add. 524.

Ontario, Lake, Shore Railroad. Reports. Fisher and Johnson, 1868.

Orleans. Nördling, 1866.

Otago Main Central Railway Report, 1877. Otago.

—— Southern Trunk Railway Loan Debates, 1870. Otago.

Ottoman Railway. Traffic of Smyrna. Clarke (H.), 1860.

Ouchy and Lausanne, Railway between. Report. Ruchonnet (E.) and others, 1869.

Oxford and Great Western Union Railway. Minutes of Evidence, 1837. Act, 1838. Oxford and Great Western.

RAILWAYS (General References): Places—*continued.*

Oxford, Worcester and Wolverhampton Railway Company. Reasons why they should not be allowed to abandon their Diglis branch, nor obtain the control of the Worcester and Birmingham Canal. Williams (E. L.), Sen., 1865.

Pacific. Heine, 1867.

—— Central Pacific Railroad Acts, 1862, '64, '65, '66. Central Pacific Railroad. Add. 491.

—— Around the World by Steam, *viâ* Pacific Railway. Anonymous, 1871, p. 40.

—— Reports, Memorial, etc., 1851, '52, '66. Pacific Railroad.

Panama Railroad. *See* Atlantic and Pacific, Junction of.

Parana. Passos (F. P.), 1883; Passos, 1882. Add. 527.

Paris. International Exhibition of Railways, 1887. Official Catalogue. Paris. Add. 525.

—— Jubilee of Paris Railways, 1887. Paris, p. 460.

—— Metropolitan Railway. Beauregard, 1883; Figuier, 1886; Flamant, 1889; Francq, 1883; Le Chatelier (H.), 1889; Nördling, 1887; Olivier, 1887; Paris, 1872, p. 460.

—— Metropolitan Railways for Paris and London. Huet, 1878.

—— Paris to Brest. Geological profiles. Mille, 1865, '67; Mille and Thoré, 1864.

Penclawdd Railway Act, 1811. Penclawdd Canal.

Pennsylvania Railroad Co. Pennsylvania Railroad Co., 1847, '74.

—— Organization, construction, and management. Dredge, 1879.

Persia. Map of Railways. Through line from Teheran to Sukkar. Stephenson (Sir R. M.), 1878.

Perth. Arbroath and Montrose lines of railway into the Valley of Strathmore. Report. Stevenson (R.), 1827.

Peru. Peru, 1874.

—— Laws, decrees and contracts. Meiggs, 1871.

Philadelphia and Reading. Reports, 1866–79. Philadelphia, p. 34

Pinxton to Leicester, projected Railway from. Jessop, 1833.

Piræus to Larissa. Athens, 1884

Pittsburgh and Connellsville. Report. Pittsburgh and C. Railway, 1853–54.

Plymouth and Dartmoor Railway. Amended Acts for construction and extension. Plymouth and Dartmoor Railway, 1819–21.

Portugal. Central Peninsular Railway. Seizure of Works by the Portuguese Government. Flanagan, 1855.

—— Extension to Badajos, etc. Report. Rumball (T.), 1855.

—— Construction of Railway. Report of the Commissioners appointed by the Government for. Portugal, 1852. Add. 529.

RAILWAYS (General References): Places—*continued.*

Preston and Wigan Railway. Report.
Preston and Wigan Rly., 1831.

Prussia. Germany, 1855–80.

—— Law of Railroad Undertakings. Prussia, 1838.

—— Masonry structures on the line of the Royal Prussian Southern Railway. Flattich, 1870, 1873–77.

Punjab. Address to the shareholders of the Punjab Railway Company. Brunton (W.), 1861.

—— Correspondence, 1860. India, p. 129.

—— Commencement at Lahore. Report, 1859. India, p. 129.

Punjab Northern Railway. Photographs. Progress Report, 1877. India, p. 129.

—— Gauges. Punjab Northern and Indus Valley Terminus. Correspondence on the Gauge, 1874. India, p. 129.

Quebec, Montreal, Ottawa and Occidental Railway. Report on rival routes. Shanley (W.), 1878.

Queensland. Doyne, 1866.

—— Railway Commissioners. John Robb *v.* Commissioners (Cairns-Harberton Arbitration).
Robb (J.), 1892. Add. 530.

—— Bowen River Railway Survey. Bowen River, 1879.

—— Burrum Railway. Burrum, 1879.

—— Cleveland Branch Railway. Cleveland, Queensland, 1886.

—— Gympie and Maryborough Railway Routes. Gympie, 1876.

—— Ipswich to Brisbane, extension. Queensland, 1871, p. 72.

—— Branch line from Ipswich to Fassifern.
Ipswich, Queensland, 1879.

—— Ipswich to Toowoomba. Maintenance.
Queensland, 1871, p. 72.

—— Victoria and South Australia. Map showing Railway Systems. Stanley (H. C.), 1880.

—— Railway from Oxley to Brisbane. Oxley, 1873.

—— Photographic Views of Railway Construction.
Stanley (H. C.), 1882.

—— Pioneer. Phillips (G.), 1892.

—— For even country. Phillips (G.), 1888.

—— Rockhampton Railway Extension.
Rockhampton, Queensland, 1892.

—— Southern and Western Railway. Proposed Deviation.
Queensland, 1873, p. 72.

—— Southern and Western Railway Scheme for a Metropolitan extension to Navigable Water. Griffiths (J. A.), 1878.
Supply of Coal. Queensland, 1876, p. 70.

—— Proposed deviation of the Northern Railway at Townsville
Townsville, 1879.

RAILWAYS (General References): Places—*continued.*

Queensland. Transcontinental Railway. Field Notes and Reports with Map, etc. Watson (Robert), 1883.

—— Report on the Direct Railway line to Warwick. Stanley (H. C.), 1886.

—— Report from Select Committee. Warwick and Standthorpe Railway. Warwick, Queensland, 1878.

—— Various Railways. Queensland, pp. 72, 73.

Recife and Saõ Francisco (Pernambuco) Railway Company. Silva Coutinho, 1875. Letter to shareholders, and reply by Directors. Mornay, 1858.

Rhine. Rhine Railway, 1864.

Rhine basin, transport of the. Borght, 1892, p. 154.

Rhondda and Swansea Bay Railway Bill. Minutes of evidence and Speeches. Rhondda and Swansea Bay, 1883.

Rhymney Railway Act. Rhymney Railway, 1885–90.

Rio de Janeiro. D. Pedro I. Railway. Alexander (A. L.).

Rome. La Metropolitana. Allievi, 1855.

Rotterdam Station. Conrad (F. W.), 1847.

Russian Railways. Russia, 1857. 1857–1862. Collignon (E.), 1858. Atlas. Blioch, 1878; Buzzi, 1881, '82. Details of construction. Glovskinsky, 1868.

—— Grazi Tsaritsin Railway. Cost of Water Supply on, Cost of working Rolling Stock, and Tables showing Temperature at six Depôts. Urquhart (T.), 1891.

—— Their insolvency. Russia, 1876.

—— Railway Management. Golovatchoff, 1881.

—— First Russian Railroad from St. Petersburg to Zarscoeselo and Pawlowsk. Kreeft, 1837.

—— Pumping gear used on the railways in Russia. Detailed drawings. Russia, 1881.

—— Six-wheeled and eight-wheeled locomotives in use on the Railways of Russia. Drawings. Russia, 1884–88.

—— Statistics. Sollohub (Count A.), 1871.

—— War Railways of the Russian Armies, 1877–78. Lessar, 1879.

Saint Gothard. Feer-Herzog, 1865. Profile of the line. Hellwag, 1876, '82. Reports, 1873–81. St. Gothard Railway. Contracts for construction, 1872–77. St. Gothard Railway. Visit to the Works. Ethelston, 1881.

—— Locomotives. Saint Gothard, 1881.

St. Jean de Maurienne, St. Julien and St. Michael Railway. Plan. St. Jean de Maurienne.

St. Lawrence and Atlantic Railroad. Morton (A. C.), 1849.

Saint Michel to Susa. Experiments made on the imperial route No. 6. Conte and others, 1866.

RAILWAYS (GENERAL REFERENCES): PLACES—*continued.*

Salisbury and Yeovil Railway. RUEGG (L. H.), 1878.

Samara-Ufa Railway. Album of Construction. SAMARA-UFA Railway, 1885–88.

Sambre and Meuse Railway. CUBITT (Sir W.) and Sopwith, 1844.

Santiago to Carril, Railway from. RUMBALL (T.), 1860.

Santiago and Valparaiso Railway. Series of views. SANTIAGO and Valparaiso Railway, 1875.

Santo Amaro. PINKAS, 1880, '82.

Sapucahy. COMPANHIA Estrado de ferro, 1889.

Saxon. SORGE, 1867.

Scandinavia. Direct railway communication between Scandinavia and the European continent. LILLJEKVIST, 1889.

Scinde. Proposed canal and railway, 1854. INDIA, p. 131.

—— Proceedings at sixth general meeting, 1859, of Scinde Railway Company. INDIA, p. 131.

—— Relation to the Euphrates Valley and other routes to India. ANDREW (Sir W. P.), 1856.

—— Formal Commencement at Kurrachee, 1858, with a memorandum on the present state of trade in Scinde. WARREN (J. N.), 1858.

—— Origin and policy. WELLS (H.), 1869.

Scinde and the Punjaub, 1858. INDIA, p. 120.

Scotland. ACWORTH, 1890.

—— Railway Amalgamation as bearing on the interests of Scotland. CAMPBELL (D.), 1873.

—— Scottish Central Railway. Correspondence as to the appointment of principal engineer. SCOTTISH Central Railway, 1844.

—— Utility of a Bar Iron Railway from Edinburgh to Dalkeith and to the harbour of Fisherrow. GRIERE and M'Laren, 1824.

—— Map of Scotland. AIREY, 1888.

—— Survey to ascertain if it is practicable to construct a Railway between the Valley of Strathmore and Dundee. LANDALE, 1825.

—— Western Coast. Scheme to improve its Railway Communications. SCOTLAND, 1892, p. 175.

Semmering. BUZZI, 1879; GHEGA, 1854.

Severn and Wye Railway and Canal Bill. Minutes of Evidence, 1869. SEVERN and Wye Railway.

Severn and Wye and Severn Bridge Railway Company. Classification of merchandise, 1891. SEVERN and Wye Railway.

Shanghai and Woosung Railway. History. MORRISON (G. J.), 1879.

RAILWAYS (General References): Places—*continued.*

Sheffield and Lincolnshire Railway Waterworks Bill. Report and minutes of evidence.
Sheffield and Lincoln Railway, 1847.

Sheffield and Rotherham Railway Bill, 1836. Report.
Sheffield and Rotherham Railway.

Simplon. Flachat, 1860; Meyer (J.), 1883.

Skipton and North-Eastern Junction Railway Bill. Aysgarth Force. Aysgarth Force, 1884.

Skipton and Kettleway Railway (Abandonment) Act, 1885.
Skipton.

Smyrna-Cassaba Railway. Statistics of the working during the second week. Smyrna-Cassaba, 1883–4.

Soudan Railway, proposed railway between Wady Halfa and Shendy. Fowler (Sir J.), 1873.

Southampton (London and) Railway Companion. Freeling, 1839.

South Eastern Railway. General statement of its position and prospects. Proceedings of General Meetings of Proprietors with reports of Directors and Engineers. Reply to Statement put forth by directors. Report of Proceedings at the 18th half-yearly General meeting of Proprietors.
South Eastern Railway, 1845–75.

—— Management under Sir Edward Watkin, 1866 to 1888.
Abbott (W.), 1888.

—— Minutes of evidence taken before the Committee of the House of Commons on the London and Dover (South Eastern) Railway Bill. South Eastern Rly., 1836.

—— Provisional Order Bill, 1891. South Eastern Rly.

—— Specifications and Particulars of Works. Brady (F.), 1874.

South Western Railway. Fuel. Campbell (D.), 1855.

—— Pending differences between the South Western and Great Western Railway Companies. Chaplin (W. J.), 1846.

—— Act for making a Railway to Southampton, 1834. Minutes of Evidence, 1834. London and South Western.

—— Rates and Charges, 1891. London and South Western.

—— Accounts, 1890, &c. London and South Western.

—— Conversion of Stock Bill, 1890.
London and South Western.

Southwold Railway. Report on Classification of Merchandise Traffic, 1891. Southwold Rly.

Spain. Coello, 1855; Spain, 235. Law and practice.
Garcés and Alvarez, 1869.

—— Leon to Gijon. Pajares, 1880.

—— Luchon, Benasque, Monzon. Peyroulet, 1883.

—— North of. Compañia de los Caminos de Hierro, 1887.

Spezia and the River Po, between the Gulf of. Paleocapa, 1861.

RAILWAYS (General References): Places—*continued.*

Stockton and Darlington. Adamson (Rev. J.), 1826; Anonymous, 1832, p. 54. History. Jeans (J. S.), 1875. Jubilee and a history of Railway Locomotion. Stockton and Darlington Rly., 1892.

—— Further report on the intended rail to the Collieries with a branch to Yarm. Stockton and Darlington Rly., 1821.

Strathmore Railway. Extension of the Dundee and Newtyle along Strathmore between Coupar and Forfar. Blackadder, 1833.

—— Memorial regarding the propriety of opening them by means of a railway or canal.
Stevenson (R.), 1820, 1821.

Sumatra. Post (J. W.), 1891.

Swedish Railways, Construction and Material for. Sweden, 1870.

—— Hudeksvall-Herjëadalen Railway.
Tolmé (J. H.), Rumball and Paton, 1877.

—— Technically and commercially. Sandberg (C. P.), 1888.

Switzerland. Bergeron (C.), 1863; Goschler, 1857; Tallichet (E.), 1870.

—— Engineering. Riese, 1887.

—— Inspection and trial of bridges, etc.
Compagnie des Chemins de fer, 1879; Switzerland, 1892.

—— Western Switzerland. Construction. Meyer (J.), 1878.

Sydney. Proposed railway to connect the North Shore Railway with Port Jackson at Milson's Point. Reports.
Sydney, 1890, p. 272.

—— Report on the extension of the Railway into the City and the North Shore Bridge Connection.
Sydney, 1891, p. 272.

Taff Vale Railway. Minutes of Evidence. Taff Vale Rly., 1837.

Tasmania. Derwent Valley Line. Detail Drawings.
Derwent Valley, 1885.

—— Tasmania Railway Inspection Bill. Correspondence relating to. Tasmania, 1875.

—— Launceston and Scottsdale line. Detail drawings.
Launceston, 1885.

—— Launceston and Western Railway. Expenditure on construction, 1875. Reports, 1875, '79, '83.
Launceston and Western Rly.

—— Mersey and Deloraine Railway. Engineer's Report, 1875.
Mersey and Deloraine.

—— Report on Terminus at Port Frederick, 1880.
Mersey and Deloraine.

—— Petition to Parliament praying that a Bill imposing restrictions on the Main Line Railway Company be not passed, and Correspondence on the same.
Tasmania, 1875.

RAILWAYS (General References): Places—*continued.*

Tasmania. Railways and Public Works. Report of Royal Commission on, and the Replies and Remarks on the report. Tasmania, 1886.

Tehuantepec Ship Railway. *See* Atlantic and Pacific, Junction of.

Texas Pacific Railroad. Buell, 1871.

Thames Haven Railway. Thames Haven Rly., 1835.

Thessaly. Bariola and Hees.

Tralee and Dingle Light Railway. Report on its working. Tralee and Dingle, 1893.

Transandine Railway (Clark's). Labatut, 1894. Add. 514.

Transcaspian. Heyfelder, 1888.

Trieste-Erfielie. Buzzi, 1885.

Trieste-Laak and Trieste-Predil-Tarvis. Buzzi (L.), 1875.

Troy and Greenfield Railroad. Reports. Troy and Greenfield Railroad, 1862–73.

Turkey. Practicability and advantage of Railway Communication in European and Asiatic Turkey. Stephenson (Sir R. M.), 1859.

—— Turkey in Europe. Question of its Railways. Turkey, 1875.

Ulverstone and Lancaster. Construction of sea embankments. Brunlees, 1855.

Union, Central, and Northern Pacific Railways. With laws relating to them. Simpson (Col. J. H.), 1866.

—— Report on the proposed change of route west from Omaha, Nebraska territory. Simpson (Col. J. H.), 1865.

—— Progress of the road west from Omaha, Nebraska, across the Continent. Union Pacific Railroad Co., 1868.

—— Report of organization and proceedings, 1864. Table of the number of miles which they are required to build each year. Union Pacific Railroad Co.

United Kingdom, the Continent, and America. Lardner, 1850.

—— Cost, traffic and working of the railways in the United Kingdom and in India, 1872–4. Baynes.

—— Introduction of the railway system into the United Kingdom. Anonymous, 1868, p. 51.

—— Mile of Railway. Haggard (F. T.), 1869.

—— Principal railways. Cumming (T. G.), 1824.

—— Railways statistically considered in relation to their extent, capital, etc. Scrivenor (H.), 1849.

United States. Hudson (J. F.), 1886; Pontzen, 1877; Poor, 1869–84; Poussin, 1836.

RAILWAYS (General References): Places—*continued.*

United States. Address to the holders of Atlantic and Great Western Railway and Erie Railway Securities in England. Nelson (J.), 1869.

—— Australian's opinion of American Railroads. Morris (A.), 1877.

—— United States and Canada Guide. Allen (W. F.), 1886.

—— Railroad Confederations or Pooling Arrangements and governmental regulation of railroads. Nimmo, 1881.

—— Reagan Bill for the regulation of Inter-State Commerce. Fink, 1879.

—— The American Railway, its construction, development, management, and appliances. Clarke (T. C.), etc., 1889.

—— Cost of American Railway construction and equipment. Nicolls, 1878.

—— Cost of Passenger traffic. Fink, 1876.

—— Cost of Railroad Transportation, railroad accounts, etc. Fink, 1875.

—— Description of Railroads. Tanner (H. S.), 1840.

—— Railway Expenditures. Kirkman, 1880.

—— History and statistics, synopsis of railroad laws. Flint, 1868.

—— Improvement of American Railways by mechanical traction. Spée (A.), 1876.

—— American Railway Master Mechanics Association. American M. M. Assoc.

—— United States Military Railroads. Report, 1861–66 M'Callum.

—— Plan of Construction of principal railroads in the northern and middle States. Knight (J.), 1838.

—— Letter from Chief Engineer of the Northern Pacific Railroad to International Convention, Portland, Maine. Johnson (E. F.), 1868.

—— Railroad to the Pacific—the Northern Route. Johnson (E. F.), 1854.

—— Northern Pacific Railroad Report. Johnson (E. F.), 1869.

—— Reports, Acts, Statistics. United States, pp. 355, 356.

—— Railway Revenue. Kirkman, 1879.

—— Railway Service, Baggage Car Traffic (Train and Stations). Kirkman, 1878.

—— Relations between railroads and waterways. North (E. P.), 1892.

—— Movement of the Farmers of the Western States against Railways and other monopolies. Hill (H. A.), 1874.

Uruguay. Projected. Tuson, 1874.

Usk (East) Railway. Minutes of Evidence. East Usk, 1885.

RAILWAYS (General References): Places—*continued.*

Victoria Railway construction. Estimated expenditure. Victoria, 1872, p. 378.

—— Victoria Railways. Estimates, Reports, etc. Victoria, 1890, 1891, p. 378.

—— Geelong and Ballarat Railway Contract with Government of Victoria for construction. Merry, 1878.

—— Inglewood and Gippsland Railway Contracts, 1877. Inglewood.

—— Management of Victoria Railways. Franklyn, 1879.

—— North-Eastern Railway, Rails and Rolling Stock. Victoria, 1870, p. 377.

—— Observations. Victoria, 1876, p. 378.

—— Reports, Bills, etc. Victoria, 1864–84, etc., pp. 377, 378.

—— Proposed Railway from Warragul to McDonald's Track, 1891. Victoria, p. 378.

Vienna Railway. Schaller, 1882.

—— Vienna Girdle Railway and proposed branches. Fogerty, 1882.

Virginia and Tennessee Railroad. Map and Profile. Blackford, 1856.

Wales. Carnarvonshire Railway. Plans. Carnarvonshire.

—— Aberystwith and Welsh Coast Railway. Carnarvonshire.

—— Carnarvon Railway. Plans and Sections. Carnarvonshire.

—— South Wales Railway. Report as to crossing the river Severn. Walker (James), 1845, p. 395.

Warwick and Leamington Union Rly. Acts 1842 and 1843. Warwick and Leamington. Add. 538.

West Highland Railway Bill, Select Committee of House of Lords on. West Highland Rly., 1889. Mountain, Moor, and Loch. West Highland Rly., 1894.

Westland Row Terminus, Enlargement of. Grierson, 1893.

Whitby and Pickering Railway Act, 1833. Whitby and Pickering Rly.

Wisconsin (West), U.S. Report. Bruff (W. F.), 1871.

Woosung Railroad Company. Time-table of trains running between Shanghai and Kangwan (First Rly. time-table in Chinese). Woosung Railroad Co., 1876.

World. Railways of the world, 1860–61. Anonymous, p. 55.

Wrexham and Ellesmere Railway Acts, 1885–1888 and 1890. Wrexham and Ellesmere Rly.

—— Mold and Connah's Quay Railway Company's Acts, 1883, 1888. Wrexham, Mold, etc., Rly.

RAILWAYS (General References): Places—*continued.*

Wrightsville and Tennille Railroad Company. Annual Reports, 1884, etc. Wrightsville, etc., Railroad Co.

York, Newcastle, and Berwick Railway (construction of docks) Bill, 1854. York, Newcastle, etc., Rly.

Yorkshire (East and West) Railways Union Bill, 1883. East and West Yorkshire.

RAILWAYS (Atmospheric). Anonymous, 1844, p. 42; Bergin, 1843; Clegg, 1839, 1840; Daigremont, 1865; Pim (J.), 1841; Samuda (Jacob), 1844; Vallance (J.), 1824.

Different modes of using the elasticity of atmospheric air as a motive force. Crelle, 1846.

Essay on the Atmospheric Railway. Turnbull (W.), 1847.

Harlow and Young's patent Atmospheric Railway. Sowerby (W.), 1848.

Improved methods of constructing and working. Mallet (R.), 1845.

New System of Inland Conveyance of Goods and Passengers. Medhurst, 1827.

Pilbrow's Atmospheric Railway and Canal Propulsion. Hewlett (Dr.), 1845. Add. 507.

Pressure (Atmospheric), adapted to the purposes of locomotion on Railways. Samuda (Jacob), 1841.

Report, 1842. Report of Select Committee, 1845. Parliamentary..Papers, p. 501.

System. Barlow (P. W.), 1845. Peculiar features. Berkley, 1845.

Chester and Holyhead Railway. Report on Atmospheric Railway. Stephenson (R.), 1844.

Croydon and Epsom Railway. Evidence on Atmospheric Railways. Croydon, 1844.

Dublin to Dalkey. Mallet (R.), 1844.

Irish Railways. Applicability to. Pim (J.), 1841.

RAILWAYS (Cable):—

Cable Railways without locomotives or horses. Devooght, 1882.

Cable Railway Propulsion. Hanscom, 1884.

Rope Railway. Construction and working. Oppizzi, 1894; Fadda, 1892. Add. 499.

RAILWAYS (Electric). Frankfort-on-Main, 1893 Add. 501; Luce, 1886; Whipple (F. H.), 1889.

Construction. Atkinson (P.), 1894.

Electric Motors on Railways. Barnes (D. L.), 1894. Add. 483; Krieg, 1890.

Electric Street Railways. Reference Book of Tables and Formulas. Merrill, 1894. Report on Storage Battery and Overhead Wire System. Winnipeg, 1891.

RAILWAYS (ELECTRIC)—*continued.*

Electric Street Railways. Theory and practice. CROSBY and Bell, 1892.

—— Electric traction. BENNETT (A. B.), 1889; RECKENZAUN, 1892.

Electrical equipment of railways, and disposition of signals. KOHLFÜRST (L.), 1883.

Electricity applied to the working of Railways. DUMONT (G.), 1885; LANGDON, 1877; WEISSENBRUCH (L.), 1885.

Electro-pneumatic Railway. JOBARD, 1846.

Recent progress. HERING (C.), 1892.

Sperry Electric Railway Company. Description of the "Whale-back" Electric Motor. SPERRY Electric Rly. Co., 1893.

American Electric Street Railways; their construction, etc. HEDGES (K.), 1894. Add. 506.

Bessbrook and Newry Electric Railway. Visit of Institution of Mechanical Engineers, 1888. INSTITUTION of M. E.

Boston, Mass. West End Street Railroad Company. Use of fenders. BOSTON, 1892.

Paris. On the Boulevards. CHRÉTIEN, 1881.

Portrush Electrical Railway. SIEMENS and Hopkinson, 1883.

United States. Daft Electric Railways in the. DAFT Electric Light Co., 1887–8.

Winnipeg. Report on Storage Battery and overhead Wire systems. RUTTAN (H. N.), 1891.

RAILWAYS (FIELD). OLMETA, 1872.

Bosnia and Herzegovina. HAUGER, 1878.

RAILWAYS (HORSE). Report, 1860. NEWLANDS.

RAILWAYS (HYDRAULIC). Statement. SHUTTLEWORTH (J. G.), 1842.

RAILWAYS (INCLINES AND MOUNTAIN RAILWAYS). KREUTER, 1883.

Abt System for steep inclines. ABADIE, 1886; ABT, 1877–88; BÖCK and Abt, 1888; EVANS (W. W.), 1886; MOLESWORTH, 1886; MUTINELLI, 1887; RINECKER, Abt and Co., 1880.

—— Diagram of symmetrical Switch of the Double Rackrail. RINECKER (F.), 1889.

—— Rack railway. SEGUÉLA (R.), 1888.

Agudio system. AGUDIO, 1879.

—— Agudio and Fell systems. AGUDIO, 1885.

Central teeth. FADDA, 1892. Add. 499.

Hydraulic power, application of. DAPPLES, 1866.

Hydro-pneumatic system. EDWARDS (G.), 1865.

Locomotives on the Semmering. ENGERTH (W.), 1854.

Meigs Elevated Railway System, 1887. MEIGS.

RAILWAYS (INCLINES AND MOUNTAIN RAILWAYS)—*continued.*

Method for overcoming Steep Gradients on Railways. HANDYSIDE, 1874, 75.

Motive power for steep inclines. Rack-rail. MALLET (A.), 1872.

Rack Railways. ARTOM di S. Agnese and Nicoli, 1892.

Riggenbach system. ABT, 1878; RIGGENBACH, 1889.

Steep-grade inclines on Mountain Railways. GOERING, 1889; WILSON (Robert), 1891.

Toothed Wheel. Germany. CURANT, 1882.

Tunnels and Inclined Planes. ANONYMOUS, 1830, p. 51.

Utilization of gravity for the descent of trains on steep inclines. OPPIZZI, 1889.

Alps. Acts of the Commission respecting the passage of the Swiss Alps and connection with the railways of Italy. ALPS, 1861.

—— Piercing of the Alps between Bardonnèche and Modane. ALPS, 1863.

—— Report of Commission on the Piercing of the Alps. ALPS, 1857.

—— Alpine railways, and adaptation for Germany and Austria. MEMMINGER, 1878.

—— Swiss Alps. ALPS, 1866.

Apennines and Alps by Mont Blanc, proposed international railway over. BONELLI, 1880.

Arlberg. MEMMINGER, 1878.

Bhore Ghaut Incline. BERKLEY (J. J.), 1858, 1863.

Blue Ridge of Rock Fish gap in the State of Virginia, Railroad across the. ELLET (C.) jun., 1856.

Brenner. MEMMINGER, 1878.

Brieg-Airolo, Abt system. ABT, 1887.

Cauterets to La Raillère, Abt system. ABT and Neveu.

Drachenfels. RIGGENBACH, 1883.

Fern. MEMMINGER, 1878.

Mexico. Fairlie Engine, mountain section of the Mexican Railway Report, and other steep gradients. SHEPHERD (Major W.) and Hughes, 1888.

Mont Cenis. Central rail of Brassey, Fell and Co., for the Pass of Mont Cenis. DESBRIÈRE, 1865.

—— Locomotive Engines and Carriages. FELL, 1866.

—— Report on the railway for crossing the, and for improving the communication with Italy, Egypt, and the East. TYLER (H. W.), 1865.

Oertelsbruch. RINECKER, 1886.

Rigi. POLE, 1873; RIGIBAHN Gesellschaft, 1871–2; KRONAUER, 1871. Abt system; ABT, 1877.

RAILWAYS (INCLINES AND MOUNTAIN RAILWAYS)—*continued.*

St. Gotthard Railway. MEMMINGER, 1878; RINECKER, 1878; RZIHA, 1875.

Simplon. GENTILINI, 1887.

Tasmania. Railway practice and Mountain railway of a similar description to the Tasmanian Railways now under construction. SHEARD (C. K.), 1886.

Thul Ghaut incline. BERKLEY (J. J.), 1861.

Tudela and Bilbao Railway across the chain of the Cantabrian Pyrenees, through the Basque provinces of the north of Spain. Model of the passage. VIGNOLES (C. B.), 1862.

Uetli. FLIEGNER, 1875.

Visp to Zermatt Railway on a mixed system, Adhesion and Rack. MEYER (J.), 1893. Add. 520.

RAILWAYS (LIGHT). ELLIS (H. S.), 1872; LAWFORD (W.), 1888; MUIR (W. J. C.), 1869; PAIN (A. C.), 1873; SHELLSHEAR (W), 1883.

Accessory Railways. Means of reducing the first cost. ARNAO and others, 1869.

Agency to be employed in their construction. PATTERSON (R. C.), 1870.

Bill to assimilate the Laws of England to those of Ireland, 1894. PARLIAMENTARY..Papers, p. 505.

Development of Light Railways. VINCENT (C.), 1882.

Light Railways as a means of Exploration. SALWEY (E. R.), 1890.

Light Railways or remunerative Railways for thinly populated districts. GREEN (C. F.), 1882.

Light and Temporary Railways. FOX (Sir D.), 1881.

Light or Road Railways. Arguments in their favour. SELLON (S. P. W. D'A.), 1888.

Local Railways. CONSIDÈRE, 1892. Add. 493.

Road Railways. SERAFON (F.), 1882, p. 184.

Secondary and economical Railways. POLESE, 1889. Add. 528.

Street Railway Journal. PERIODICAL PUBLICATIONS, p. 25.

Argentine Republic. HUERGO, 1872.

Ballinascarthy and Timoleague Junction light Railway. Classification of Merchandise Traffic. BALLINASCARTHY, 1891.

Bareilly to Ranibagh, Project for a light Railway from. MACDONALD (J.), 1879.

Cavan, Leitrim and Roscommon Light Railway and Tramway. CAVAN, 1891.

Dives and Luc-sur-Mer (Calvados). DECAUVILLE, 1893. Add. 496.

France. DECAUVILLE, 1891. Add. 496; SAMPITÉ (A.), 1888.

RAILWAYS (LIGHT)—*continued.*

Ireland, Light Railways applicable to. SLOANE (J. S.), 1883.
New South Wales. BURGE, 1892.
Sweden. SANDBERG (C. P.), 1870.
Torrington and Marland Light Railway. Description of the line and abridged Reports on trials made in 1882.
TORRINGTON and Marland Light Rly. Add. 536.
Victoria. VICTORIA, 1869, p. 377.

RAILWAYS (MILITARY).

Coast and Harbour defence, use of Railways for. GIROUARD, 1891.
Employment of Railways in time of War. BODY, 1870; FORMANOIR, 1891.
Hilf's system of Railway and the Military arrangements in Germany for working Railways in time of War.
GERMANY, 1885.
Military Field Railways. FELL, 1876; REYMOND (L. von), 1881.
Military Manual. ISSALÈNE, 1873.
Military Railway in Prussia. BAUM, 1877.
Military studies. DU PUY de Podio, 1869.
Narrow-gauge Railways in the Operations of War. FELL, 1873.
Preparation of Railways for war in time of peace.
WEBER (M. M. von), 1870, '71.
Use of Railways during the Eastern War, 1876–78. MARTNER, 1878.
Working from the point of view of Military economy.
AGUDIO, 1880.

RAILWAYS (SINGLE RAILS).

Colonies. One rail railway. HADDAN (J. L.), 1871.
Lartigue Elevated Single Rail Railway. BEHR and Petit, 1886.
Proposed elevated Single Rail Railway to Roundhay Park.
JEFFERSON and Pullon, 1887.
Railways with a single rail. LARMANJAT, 1868.
Telegraphic Railways or the single way recommended.
COOKE (Sir W. F.), 1842.

See also RAILWAYS (Inclines and Mountain Railways).

RAILWAYS (PNEUMATIC). DAPPLES, 1866; GONIN (L.), 1880, 1886.
Lausanne to Ouchy. GAUDARD, 1869.

RAILWAYS (SHIP). CORTHELL, 1885.
Eads Ship Railway. AMMEN (D.), 1886.
Ship Railway. Working of the first one.
SMITH (William), Aberdeen, 1893.
American Isthmus. REED (Sir E. J.), 1881.
Chignecto Ship Railway. KETCHUM (H. G. C.), 1893. Add. 513.

RAILWAYS (SHIP)—*continued.*

Chignecto Ship Railway. Ship Transportation and the Chignecto Ship Railway. CHIGNECTO, 1882; KETCHUM (H. G. C.), 1892. Add. 513.

Suez, proposed, across the Isthmus of. BRUNLEES and Webb.

See also ATLANTIC AND PACIFIC (Junction of).

RAILWAYS (SLIDING).

Gerard and Barre's sliding railway. NANSOUTY, 1890.

Hydraulic propulsion. GIRARD (L. D.), 1889.

Sliding Platforms and turn-tables. FRÄNKEL, 1876. Add. 501.

RAILWAYS (STREET). SÉRAFON, 1878. Memorandum. BRUCE (Sir G. B.), 1860.

Electric Motors. KRIEG, 1890.

Europe and United States of America. LINDHEIM, 1888.

Elevated Railways. FADDA, 1894. Add. 499.

Iron superstructure. BÖTTCHER, 1878.

Street Railway Journal. PERIODICAL Publications, p. 25.

See also TRAMWAYS.

RAILWAYS (UNDERGROUND). FADDA, 1894. Add. 499.

Railway Communication in great cities. Automatic Ventilation. HAZARD (R. R.), 1889.

London Electric. LUIGGI, 1891.

Philadelphia. Feasibility of. HAUPT (L. M.), 1888.

RAILWAYS (ACCIDENTS). ADAMS (C. F.), jun., 1879; BROWN (H.). 1853; RITCHIE (R.), 1846; WITH (E.), 1854.

Campbell's (Lord) Act, operations of. ANONYMOUS, 1852, p. 42.

Cause and prevention of Railway Accidents. ANONYMOUS, 1874, p. 58; HUISH, 1852; MARTIN (S. M.), 1874.

Circular by the Board of Trade to Railway Companies, 1874. PARLIAMENTARY..Papers, p. 501.

Electrical systems for the prevention of accidents. CASTRO, 1858, 1859.

Method for obviating collisions between successive trains. CURTIS (C. B.), 1841; OGAN, 1855; POWER (J.), 1842.

Prevention of Railway Accidents. ANONYMOUS, 1853, p. 53; SMITH (John C.), 1874.

Reports of Courts of Inquiry, 1874–77. PARLIAMENTARY..Papers, p. 501.

—— Royal Commission. Report, 1877. PARLIAMENTARY..Papers, p. 501.

RAILWAYS (ACCIDENTS)—*continued.*

Reports. Return of fatal accidents at Level Crossings, 1894. PARLIAMENTARY..Papers, p. 501.

—— Regulations for the better protection of men (Platelayers and Fogmen) employed in foggy and snowy weather, 1889. PARLIAMENTARY..Papers, p. 501.

—— Returns, 1884–1890, of the number of Railway servants killed by accidents and the number of instances in which such fatal accidents have been investigated by the Board of Trade. PARLIAMENTARY..Papers, 1894. Add. 526.

—— Report of Select Committee, 1858. PARLIAMENTARY..Papers, p. 500.

—— Reports of inspecting officers, 1853–76. PARLIAMENTARY..Papers, p. 500.

—— Return of accidents and injuries, 1847–76. PARLIAMENTARY..Papers, p. 500.

—— Return of Accidents and Casualties (Board of Trade), 1877, etc. PARLIAMENTARY..Papers, p. 500.

—— Reports to Board of Trade on Accidents, 1870, etc. PARLIAMENTARY..Papers, p. 500.

—— Report of Select Committee on the Laws of Compensation, 1870. PARLIAMENTARY..Papers, p. 500.

—— Report on the Regulation (Prevention of Accidents) Bill, 1873. PARLIAMENTARY..Papers, p. 501.

—— Reports on the Laws of Foreign Countries relating to Railway and Shipping Disasters, 1873. PARLIAMENTARY..Papers, p. 501.

Safe Railway Working. A treatise on Railway Accidents. STRETTON (C. E.), 1887.

Bhore Ghat incline, Great Indian Peninsula Railway, Accident on the. BERKLEY (Sir G.), 1869.

Boston and Providence Railroad. Disaster on Monday, March 14, 1887, at the Bridge called Bussey Bridge. BOSTON and Providence Rly., 1887. Add. 486.

Brighton Railway Accident. POWER (J.), 1842.

Carlisle (Citadel) Station. Accident, 1890. CARLISLE.

Dunphail Station (Highland Railway). Accident on April 27th, 1894, to passenger train at. DUNPHAIL, 1894. Add. 497.

Harrison's Level Crossing, accident at, 1877. HARRISON'S Level.

Liverpool and Manchester Railway. Account of the melancholy accident that occurred at its opening. WALKER (James S.), 1831.

Seacombe, Hoylake and Deeside Railway. Collision near Hoylake Station, 1888. HOYLAKE.

Tralee and Dingle Light Railway. Report of the inquiry into the accident at Camp, May 22, '93. TRALEE and Dingle.

RAILWAYS (Axles). Bessemer, 1847.

Great Indian Peninsula Railway. Results of tests made on 100 cast steel Crank Axles supplied to.
Berkley (Sir G.), 1880, p. 485.

Influence of form considered in relation to strength.
Bramwell, 1869.

Malleable Iron. Manufacture with results of experiments on the Strength of Railway Axles. Thorneycroft (G. B.), 1850.

Rational form of Axles. Matthey, 1872.

Result of experiments on their strength.
Thorneycroft (G. B.), 1850.

Temperature, effect of, on their strength.
Andrews (T.), 1886–91.

Wrought Iron. Strength of. Andrews (T.), 1890.

RAILWAYS (Brakes). Anonymous, 1891, p. 41; Marshall (W. P.), 1887.

Automatic. Bonnin (R.), 1886.

Brake Experiments made at Gisburn on the Lancashire and Yorkshire Railway. Galton, 1880.

Brake power for Railway trains. Woods (E.), 1877.

Comparative experiments with Messrs. Newall and Fay's Brakes.
Fay, 1858.

Eccentric Brake. Pilbrow, 1882.

How the question is being manipulated in England.
Tyler (H. W.), 1877.

Patent Railway Brake Apparatus. Chambers and Champion, 1858. Hall (W.), (1859); Newall (J.), 1854, '59.

Plan to prevent trains from running off the rails and for stopping them instantaneously. Wachter (J. P.), 1852.

Specification of apparatus for Working Railway Brakes.
Fay, 1859; Hall (W.), (1858).

See also Brakes.

RAILWAYS (Brakes—Continuous). Anonymous, 1877, p. 43; Fox (W. H.), 1872; Gravell, 1886; Harris (H. G.), 1889; Reynolds (M.), 1882.

Act to provide for their use on passenger trains, 1883.
Parliamentary..Papers, p. 501.

Air, compressed. Continuous automatic brakes.
Schleifer (M.), 1886.

Combined action of automatic brakes of a train and steam brakes of a locomotive. Bonnin, 1888.

Continuous Automatic Brakes.
Sanders (R. D.) and Bolitho, 1879.

RAILWAYS (BRAKES—CONTINUOUS)—*continued.*

—— Correspondence and returns, 1877, etc.
PARLIAMENTARY..Papers, p. 501.

Continuous Pneumatic Railway Brakes. KIERMAN, 1887.

Continuous self-acting Brakes. Arguments against.
HAGGARD (F. T.), 1880.

—— Simple and self-acting continuous Brakes.
HAGGARD (F. T.), 1882.

Hardy's Vacuum Brake. BELCSAK, 1879.

Heberlein self-acting Railway brake on the Bergisch-Markisch Railway. CARLILE, 1880.

Quick-acting air brakes. KAPTEYN (A.), 1889.

Vacuum brake (Automatic). BONNIN (R.), 1888; VACUUM Brake Co., 1891.

—— Vacuum Brake Company. Extracts from Board of Trade returns on Continuous Brakes, illustrating faults.
VACUUM Brake Co., 1893–4.

—— Improvements. Patent Specification. GRESHAM (J.), 1890.

—— Vacuum continuous automatic Brake, with universal coupling. ANONYMOUS, 1885, p. 58.

Wenger's Compressed Air Brake. Report. VICAIRE (E.), 1882.

Westinghouse Brake. BLAKENEY, 1889.

—— Applied in Belgium on a train of 50 trucks.
WESTINGHOUSE Brake Co., 1890.

—— Descriptions and drawings of.
WESTINGHOUSE Brake Co., 1892.

—— Illustrated catalogue. Reference Book, etc.
WESTINGHOUSE Brake Co., 1872, '89.

—— Experiments made by the North Eastern Railway Company at York. GALTON, 1879.

—— Train-Pipe Indicator. KAPTEYN, 1885.

—— Report, 1879. PARLIAMENTARY..Papers, p. 501.

—— Westinghouse and Smith Brakes. BLANCQUAERT, 1877.

—— Automatic Brake. Applied on a train of 50 carriages, etc.
WESTINGHOUSE Brake Co., 1890.

Woods' continuous automatic Railway brake. Report.
VICTORIA, 1881, p. 378.

Woods' and Westinghouse continuous automatic Railway Brake. Report on. VICTORIA, 1883, p. 378.

RAILWAYS (BRIDGES). *See* BRIDGES.

RAILWAYS (CARRIAGES):—

Advisability of providing separate compartments for female passengers. Circular, 1887. Replies, 1888.
PARLIAMENTARY..Papers, p. 503.

RAILWAYS (CARRIAGES)—*continued.*

Construction of carriages. FAIRLIE, 1868; Voss (W.), 1892.
Disinfection of Carriages. RANDONE, 1890. Add. 530.
Freight cars, high capacity, tubular frame. Goodfellow and Cushman cars. JEFFERDS (M. R.), 1890.
Grease for railway wagons. HEUSINGER von Waldegg, 1864. Add. 507.
Hygiene. RANDONE, 1894. Add. 530.
Improved Appliances for enabling Railway Vehicles to be transferred to and transported along a railway with a gauge narrower than the vehicle. SUDELEY (D.), and Webber, 1887.
Improvements. BODMER (J. G.), 1844.
Improvements in the means of retarding and connecting them. THORNTON (S.) and M'Connell, 1848.
Improvements in Re-railing Carriages or Wagons on rails. STROUDLEY (W.), 1868.
Powell's patent sectional, transferable carriage. General Pasley's report, 1846. PARLIAMENTARY..Papers, p. 510.
Railroads and Carriages. TREDGOLD (T.), 1825, 1835.
Researches on the best form of carriages. VIDARD (J. B.), 1875.
Returns relating to Continuous Footboards, 1878. PARLIAMENTARY..Papers, p. 502.
Safety, means of promoting, in Carriages. CAYLEY (Sir G.), 1841.
Side-rolling motion of Railway-carriages; first system for its suppression. SCHENDEL (P. van), 1853.
Specifications for Railway Carriages, 1882. LONDON, Chatham and Dover Railway.
—— and Locomotives. LANCASHIRE and Yorkshire Rly.
Statement of proportionate weights, capacities and bearing powers of wagons on several lines. ANONYMOUS, 1870, p. 56.
Transport of sick and wounded in War. RANDONE, 1889. Add. 530.
Uniform movement. NAVIER, 1835.
England. Vocabulary of the leading terms used in English railway-carriage and wagon construction. FORNEY, 1888.
United States. Car-builder's Dictionary. FORNEY, 1879, '88.

RAILWAYS (CARRIAGES: HEATING AND LIGHTING).

Automatic Electric Lighting of Trains. CARSWELL, 1887.
Car-heating. CONSOLIDATED Car-heating Co., 1890.
Continental railways. PINTSCH's Patent Lighting Co., 1880.
Electric Lighting. ACCUMULATOREN-Fabrik. Add. 479.
Illumination, heating and ventilation. VEROLE, 1892. Add. 537.
Train-lighting experiment. MASSEY, 1884.
Ventilation. RUTTAN (H. N.), 1862.
Warming, Ventilating and Lighting. BARNETT (J. D.), 1887.

RAILWAYS (Clearing House).

Clearing-house system in England, and introduction of the system into Russia. Carlile, 1880.

Clearing system on narrow gauge railways. Morison, 1846.

System for the management of railway traffic between competing lines. Hayes (J. D.), 1871.

London. Bergeron (C.), 1863; London and North Western Rly., 1849.

RAILWAYS (Couplings).

Couplings of Locomotive tender. Hartmann (W.), 1884.

"Only" patent Drawhead and automatic car-coupler. Toomer (J. F.), 1894. Add. 536.

Return relating to Coupling appliances of wagons owned by Railway Companies, 1889. Parliamentary..Papers, p. 502.

RAILWAYS (Crossings). Abolition of grade crossings in the City of Worcester, Mass. Allen (C. A.), Locke and Ellis; Worcester, Mass., 1892.

Sidings and Crossings. Winkler (E.), 1874.

RAILWAYS (Curves). Santos, 1882.

Assistant Engineer's Railway Guide in boring, stumping, and niching out centre lines and curves. Haskoll (W. D.), 1846.

Circular Curves for Railways, Field practice of laying out. Trautwine (J. C.), 1875, '86, '87.

Cyclograph, a new instrument for setting out curves. Price-Williams, 1849.

Examples of the modes of setting out Railway curves. Law, 1846; May (R. C.)., 1841.

Laying out of Curves. Helmert, 1872; Kröhnke, 1873.

Levelling of declivities and curves. Nördling, 1867.

Passage of rolling stock round Curves. Roy, 1894.

Provisional railway near Delft. Conrad, 1847.

Railway Curves. Castle (H. J.), 1845; Lean, 1872.

Railway Curves and Location. Treatise. Shunk (W. F.), 1873.

Reduction of curves in uneven country. Martin (Jules), 1886.

Rules for ranging Railway Curves with the theodolite and without tables. Brodie, 1847.

Spiral Railroad: theory of the compound transition curve. Searles (W. H.), 1884.

Table (Universal Curve) for ranging Railway Curves. Gallott, 1868, '84.

Tables for setting them out. Darbyshire 1846.

Tangents. Modes of describing and adjusting Railway Curves and Tangents. Mifflin, 1837.

Theory and practice of setting out Railway curves. Hill (W.), 1847.

RAILWAYS (Cuttings and Embankments).
Gregory (Sir C. H.), 1844.

Earthslips. Kaven, 1883.

Earthworks. Heyne, 1878; Rziha, 1876–77.

Formulas for calculation. Excavation and Embankment.
Davis (J. W.), 1877.

Introduction of constructions to retain the sides of deep cuttings in Clays. Hosking (W.), 1844.

Methods for computation from estimates of Railway Earthwork.
Wellington (A. M.), 1887.

Rules for ascertaining the relations between alterations in Gradients and the required changes in the contents of Cuttings and Embankments. Ibbetson (D. J. H.), 1847.

Setting out the lines and levels of Railway Works in cuttings, embankments, and permanent way, bridges and viaducts.
Haskoll (W. D.), 1848.

Slips in the London Clay. London and Brighton Railway.
Gregory (Sir C. H.), 1844.

Tables for calculation of Earthwork and Land required in the construction of Railways. Hughes (J.), 1846.

—— Earthwork Table for Parliamentary and Working sections of Railways. Lowe (J.), 1846.

—— Tables for computing the contents of Earthwork.
Macgregor (W.), 1871; Sibley (C. K.) and Rutherford, 1847.

RAILWAYS (Gauges). Clarke (H.), 1846; Evans (W. W.), 1872.

Battle of the Gauges. Addis (H. B.), 1873.

Break of Gauge; unity of the Iron network, disadvantage of.
Hunt (T.), 1846.

—— Evils of diversity of gauge. Harding (W.), 1846.

—— Evils of the break of gauge. Great Western Railway, 1846. Lushington, 1846.

Broad and Narrow Gauge. Alzola, 1888; Lushington, 1846; Great Western Railway, 1846; Pihl (C.), 1874.

Broad gauge, the bane of the Great Western Railway.
Great Western Rly., 1846.

Commissioners (Gauge). Reply to "observations" of the Great Western Railway on their Report.
Great Western Rly., 1846.

Construction, machinery, economy, etc.
Evans (W. W.), 1872, '73.

Dialogues of the Gauges. Anonymous, 1846, p. 46.

Double Gauge, observations on Mr. Brunel's report.
Stephenson (R.), 1847.

Double Gauge railway system. Its dangers, history and prospects.
Sidney (S.), 1847 and 1846.

RAILWAYS (GAUGES)—*continued.*

History. POLE, 1875.

Inconsistencies of men of genius exemplified in the practice and precept of I. K. Brunel and in the theoretical opinions of C. A. Saunders. BRUNEL (I. K.), 1846.

Influence of gauge upon the constructive cost and working expenses of railways.
DOBSON, 1871 ; PETERSSON (A. J.), 1877.

Narrow-gauge railways. CISNEROS, 1872; DECAUVILLE, 1891. Add. 496 ; FELL, 1871 ; LEDOUX, 1874 ; SPOONER (C. E.), 1871, '79.

—— America. BARTELS, 1878.

—— Laying out of narrow-gauge secondary railways, and provision of the means of establishing the same.
FARWELL (G.), 1880.

—— Opinions on narrow-gauge railways. NÖRDLING (W.), 1871.

Narrow-gauge speedier than broad-gauge Railways, as well as cheaper. MELVILLE (H. S.), 1846.

Narrow and wide gauges considered. ANONYMOUS, 1845, p. 49.

Narrow-gauge economy with efficiency *v.* Broad-gauge costliness and extravagance. FAIRLIE, 1872.

—— Report of the Royal Engineers on Mr. Fell's narrow-gauge system of railways. ROYAL Engineers, 1870–76.

—— Narrow Gauges as applied to main trunk lines of Railways.
SEYMOUR (S.), 1871.

Powell's sectional transferable Railway Carriages for carrying goods, either on the broad or narrow gauge. Report, 1846.
PARLIAMENTARY..Papers, p. 502.

Question of the Gauges commercially considered.
ANONYMOUS, 1846, p. 53.

Railway Gauge Question. LATROBE, 1872.

Railway results, or the gauge deliverance. DWARRIS, 1845.

Reasons for preferring the recommendations of the Gauge Commissioners to the proposals of the Board of Trade.
ANONYMOUS, 1846, p. 48

Reasons why it should receive legislative sanction.
ANONYMOUS, 1846, p. 45.

Report of Gauge Commissioners, 1846. Observations on Report, 1846. PARLIAMENTARY..Papers, p. 502.

Seventy-five centimetres. HERIZ, 1889.

Standard and Narrow Gauges. WEBER (M. M. von), 1880.

Uniformity of gauge, Railway Traveller's reasons for adopting.
ANONYMOUS, 1846, p. 53.

America. Narrow-Gauge Railways. FLEMING, 1875.

India. Break of Gauge in London. Reports.
ANDREW, Sir W. P., 1872, 1873.

RAILWAYS (GAUGES)—*continued.*

India. Comparison of the Rajpootana metre-gauge Railway with the G.I.P. and B.B. and C.I. standard-gauge railways. CARROLL, 1879.

—— Narrow-gauge railways for India. BIDDER, 1870.

—— Indian narrow-gauge lines of railways. Reports on. STRACHEY (Lt. Gen. R.), Dickens, etc., 1870.

Ireland. Narrow-gauge railways. LEWIS, 1882.

Oxford, Worcester and Wolverhampton Railway. Gauges. Documents on the question of gauge. OXFORD, Worcester and W. Rly., 1856.

St. Lawrence and Atlantic Railroad. MORTON (A.C.), 1847.

Tasmania Narrow-Gauge Railway. Letter. TASMANIA, 1875.

Turkey. Breadth suitable for railway. HADDAN, (J. L.) 1873.

Victoria Railway Gauges, broad and narrow. Correspondence and Reports. VICTORIA, 1872, p. 378.

RAILWAYS (JUNCTIONS).

Junctions and Connections for Lines of Railways. THOMSON (A. W.), 1880.

RAILWAYS (LEGISLATION).

Acts. Railway Acts, 1844–49. PARLIAMENTARY..Papers, p. 504.

Act for regulating Railways, 1844. PARLIAMENTARY..Papers, p. 503.

Act for the better regulation of Railways, and for the conveyance of Troops, 1845. PARLIAMENTARY..Papers, p. 503.

Act on Conditions to the Construction of future railways, 1845 PARLIAMENTARY..Papers, p. 503

Act for consolidating in one Act provisions inserted in Acts authorising the making of Railways, 1845. PARLIAMENTARY..Papers, p. 503.

—— Railway and Canal Traffic Act, 1888. HUNTER (W. A.), 1889. Merchandise Traffic of Great Western Railway. GREAT Western Railway. Reports. WAGHORN (T.) and Stevens, '90.

—— Reports from Select Committee on Railway Acts Enactments, 1846–47. PARLIAMENTARY..Papers, p. 503.

—— Passenger Duty. Act to repeal duties, 1843. Return of Amount of Duty, 1833–1843. PARLIAMENTARY..Papers, p. 505.

—— Acts for the regulation of railways, 1830–63. BIGG (J.), 1864.

—— Public general Acts for the regulation of Railways, 1855. PARLIAMENTARY..Papers, p. 504.

—— Regulation of Railways Act, 1873. Practice before Railway Commissioners. JUNNER, 1874.

—— Regulation of Railways Act, 1873, working of. ANONYMOUS, 1878, p. 50.

RAILWAYS (LEGISLATION)—*continued.*

Acts. Railway Traffic Local Control Act, 1893.
PARLIAMENTARY..Papers, p. 505.

Bills. Railway Bills. Report, 1836. Returns of number, 1843, '45, '46, 1868–72. PARLIAMENTARY..Papers, p. 503.

—— Report on Railway, Canal, Tramway, Gas and Water Bills, 1854, etc. PARLIAMENTARY..Papers, p. 504.

—— Account relative to Railway Bills, 1847.
PARLIAMENTARY..Papers, p. 503.

—— Reports from Select Committee on Railway Bills, 1845.
PARLIAMENTARY..Papers, p. 503.

—— Return of names of all bills on which Committees have made reports, 1845. PARLIAMENTARY..Papers, p. 503.

—— Railway and Canal Traffic Bill. RAILWAY, 1888.

—— Bills for regulation of Railway and Canal Traffic, 1886, '87; amended, 1888; Act, 1888; Amending Acts, 1892, '94.
PARLIAMENTARY..Papers, p. 504.

—— Carriage of Timber. Bill to amend provisions of Orders, 1893. PARLIAMENTARY..Papers, p. 507.

—— Bill for the Revision of charges, 1888.
PARLIAMENTARY..Papers, p. 505.

—— Charges for carriage of Fish. Bill, 1888; Return, 1888.
PARLIAMENTARY..Papers, p. 506

—— Charges for goods despatched from private sidings. Bill, 1893. PARLIAMENTARY..Papers, p. 507.

—— Bills to amend Railway Charges, 1893, '94.
PARLIAMENTARY..Papers, pp. 507–8.

—— Bill to amend constitution, powers, and procedure of the Railway Commission, 1894.
PARLIAMENTARY..Papers, p. 505.

—— Bills to amend the Regulation of Railway Acts, 1889, '93.
PARLIAMENTARY..Papers, p. 504.

—— Reports from Select Committee on Railway Bills, 1845.
PARLIAMENTARY..Papers, p. 503.

—— Bill to make further provision for the safe working of Railways, 1887. PARLIAMENTARY..Papers, p. 504.

—— Servants. Bills to shorten hours of labour, 1891, 1893. Report from Standing Committee on Trade, 1893. Amendments, 1893. PARLIAMENTARY..Papers, p. 509.

—— Tickets. Bill to compel companies to print on tickets the fare charged, 1889. PARLIAMENTARY..Papers, p. 510.

—— Bill to enable passengers to make use of return tickets at any time, 1894. PARLIAMENTARY..Papers, p. 510.

Law of Railways. SHELFORD (L.), 1853; VIGOUREUX (E.), 1886.

Law of Railway, Canal, Water, Dock, Gas and other Companies.
WORDSWORTH (C. F. F.), 1851.

Law relating to the duties of Railway Companies as carriers of goods and live stock. REDMAN (J. H.), 1870.

RAILWAYS (Legislation)—*continued.*

Law. Is it desirable to alter the Law which Prohibits the Railway Companies from paying Interest out of Capital?
Perks (R. W.), 1883.

Law of Railways, railway companies, and railway investments.
Hodges (Sir W.), 1865, '76.

—— Handy Book of Railway Law. Moore (A.), 1860.

Legislation. Carter (S.), 1874; Coates, 1854; Doull, 1848.

—— Influence of English Railway Legislation on Trade and Industry. Morrison (J.), 1848.

—— Defects of the English System. Morrison (J.), 1846.

Passengers. Reform of the legislation and administration for the conveyance of Passengers and Goods.
Chadwick (Sir E.), 1865, p. 235.

—— Report of Select Committee on the present law relating to the Railway Passenger Duty, 1876.
Parliamentary..Papers, p. 505.

Rates. Railway Rates Law. Richards (H. C.) and MacGeagh, 1889.

—— Law relating to rates and traffic.
Butterworth and Ellis, 1889.

—— Suggested alterations in the law of rating railways.
Bott, 1856.

Redesdale, Lord, as a railway legislator. France (R. S.), 1867.

RAILWAYS (Masonry). Nicholson (P.), 1846.

RAILWAYS (Permanent Way). *See* Permanent Way.

RAILWAYS (Rates). Acland (C. T. D.), 1887.

The Railways and the Traders. Acworth, 1891.

RAILWAYS (Receipts and Expenditure).

Amount of money expended on all railways in Great Britain and Ireland, 1841–47. Parliamentary..Papers, p. 502.

Railway Capital, 1826–1844. Parliamentary..Papers, p. 502.

—— Capital or stock authorised to be raised by Railway Bills, 1847. Parliamentary..Papers, p. 502.

—— Return showing for each railway company the amount of capital and loans. Parliamentary..Papers, p. 502.

—— Returns showing Capital, Traffic, Working Expenditure, Rolling Stock, etc., of each Railway Company in England and Wales, Scotland and Ireland, 1859, etc.
Parliamentary..Papers, p. 502.

Railway Deposits. Moneys paid on account of Railway Bills, 1846.
Parliamentary..Papers, p. 503.

Railway expenditure, previous to 1847.
Parliamentary..Papers, p. 502.

RAILWAYS (Receipts and Expenditure)—*continued.*

Railway finance. Anonymous, 1867, p. 45.

Report to the Board of Trade on share and loan capital, traffic, working, and expenditure, and net profits (Railway Companies of the United Kingdom). Parliamentary..Papers, p. 502.

Return showing the Holding of Debenture, Preference, and Ordinary Stock (Railways of the United Kingdom), 1886. Parliamentary..Papers, p. 502.

Returns of sums paid up by the several Railway Companies, 1847. Parliamentary..Papers, p. 502.

Subscribers to Railways and amount of subscriptions, 1845–46. Parliamentary..Papers, p. 502.

RAILWAYS (Rolling Stock). Dapples, 1866.

East Indian Railway. Drawings of Rolling Stock at Howrah Workshops. Pearce (R. W.), 1888–9.

Facilities of "flexible" rolling stock for economically constructing maintaining, and working railways or tramways. Grover (J. W.), 1870.

Grazi Railway. Rolling Stock Plan. Urquhart (T.), 1878.

Master Car Builders' Association Reports, 1884, etc. Master Car Builders.

Permanent Way, Rolling stock, and technical working. Couche, 1867, 1877.

State Railways. Drawings of the Rolling Stock. Prussia, 1885.

Tables. Price-Williams, 1870.

Traction and buffing gear. Smith (G.), jun., 1864.

Train Resistance. Frank (A.), 1886.

RAILWAYS (Safety Appliances). Bramwell, 1875.

RAILWAYS (Signals). Bramé, 1867; Schmitt, 1878. Add. 533.

American Signals and Stations. Bartels, 1879.

Apparatus for protecting trains standing at a signal cabin on either the right or wrong line. Malan, 1890.

Arrangements (Signal) and Systems of Working, 1874, etc. Returns by Railway Companies relative to. Parliamentary..Papers, p. 509.

Automatic Danger Signal. Barr (H. J.), 1874.

—— Baranowski's Automatic Railway Signals. Baranowski, 1858, 1887.

Automaton (Patent) Distant Signal. Baranowski, 1859.

Electric Safety Distance Signal for Railways. Hipp, 1862.

Electric Signals. Castro, 1858.

Electro-semaphore Apparatus. Lartigue and Tesse, 1873; Mors, 1879.

—— For the working of railways of double lines by sections, and for working single lines. Prud'homme (P.), 1873.

RAILWAYS (SIGNALS)—*continued.*

English system. SAUVAGE (E.), 1893; TARDIEU (A.), 1869.
Fogs and snow storms, signalling trains in. BURN (R.), 1877.
Interlocking Railway Point and Signal Levers.
MIDLAND Railway, 1881; SMITH (Walter P.), 1880.
Lectures on Railways and Railway signalling, etc.
TYLER (H. W.), 1877.
New method. SALOMONS (Sir D.), 1874, 1875.
New system of signal-disks, etc., specifications.
BARANOWSKI, 1864.
Optical and acoustic signals. Models of stations, etc.
MORANDIÈRE (J.), 1867.
Patent train signalling Telegraphs. Description. TYER (E.), 1862.
Railway (Improved) Switch and locking apparatus.
HUCKRALE, 1874.
Railway Telegraph and Signals. WEBER (M. M. von), 1867.
Safety Signals. General Railroad Convention, New York. Report of the Committee on Safety Signals.
WELCH (A.), 1866.
Signal apparatus for stopping trains. ANONYMOUS, p. 48.
Signals in connection with Vacuum Brakes. Patent Specification.
GRESHAM (J.), 1890.
Signals and Accidents. DAWNAY, 1874.
Train Signalling System. WALKER (C. V.), 1857, '58.

RAILWAYS (STATISTICS). United States Railroads Statistical report. SHUMAN (A. E.), 1883.

RAILWAYS (STATIONS). FADDA, 1893, '94. Add. 499.
Buildings. HACAULT, 1862.
Handbook of Railway Station Management. IVATTS, 1861, '87.
Means of Communication between intermediate places and Stations. POLLITT, 1892.
Sheds. FADDA, 1894. Add. 500.

Antwerp. New Eastern station. SCHAFFERS (V. F.), 1889.
Arezzo, stability of the shed. ROMBAUX, 1876.
Birmingham. Iron Roof of Station, New Street.
PHILLIPS (Joseph), 1855.
Copenhagen. Enlargement of the railway station.
COPENHAGEN, 1881.
Dendre and Waes. Stations. CHUSENAAR, 1885.
Dunedin, N. Z. Correspondence relating to the reclamation of Dunedin Harbour and Railway Station.
DUNEDIN, 1878. Add. 497.
London. Euston Station. Suggestions for the improvement of.
TURNER (R.), 1850.

RAILWAYS (STATIONS)—*continued.*

London. Report of Commissioners on Railway Termini, 1846.
PARLIAMENTARY..Papers, p. 509.

Mannheim. Central goods station. MANNHEIM.

United Kingdom. Bill to provide for better advertising of the names of Stations in Great Britain, 1889.
PARLIAMENTARY..Papers, p. 509.

—— Stations, Junctions, Sidings, etc., in the United Kingdom.
OLIVER (H.), and Airey, 1877, '93.

RAILWAYS (STATIONARY ENGINES AND ROPE TRACTION). Cable or Rope Traction as applied to the working of Street and other Railways. SMITH (J. B.), 1887.

RAILWAY (SURVEYING). Location and Construction. Theory and practice. SEARLES (W. H.), 1885.

RAILWAYS (TRAFFIC). Workmen's Trains and liability in case of injury or death. Correspondence.
PARLIAMENTARY..Papers, 1894. Add. 526.

Goods traffic (English). LUIGGI, 1888.

RAILWAYS (WHEELS AND AXLES).

Bogie Engines and Elastic self-adjusting railway carriage-wheels.
SMITH (G.), jun., 1865, p. 211.

Cylindrical Wheels, Use of. RANKINE (W. J. M.), 1842.

Patent Railway Wheel. TOUGH (J.), 1877.

American cast-iron chilled disk Railway wheels.
BARNHAM, Richardson and Co., 1877.

South Australia. Iron wheels with riveted tires. Report on the expediency of continuing them or otherwise.
SOUTH Australia, 1875, p. 228.

RAINFALL (GENERAL REFERENCES). BATEMAN (J. F. La T.), 1881.

Catchment-basins. NEVILLE (J.), 1860–61.

Drought (Great) of 1893, etc. BRODIE (F. J.), 1893. Add. 488.

Evaporation and filtration. GEDDES, 1855.

Globe. Total annual rainfall of the Globe.
MURRAY (John), 1887.

—— Comparative chronological account of some of the principal records. TRIPP (W. B.), 1890.

Penetration of rain into the soil.
GOSSELET (J.), 1870. Add. 503.

Pictorial Rain Maps. RUSSELL (H. C.), 1893.

Rain and Rivers. GREENWOOD (G.), 1866.

Relation of Rainfall to the water flowing from the ground.
BATEMAN (J. F. La T.), 1845.

Relation to the annual discharge of Rivers.
MURRAY (John), 1887.

RAINFALL (General References)—*continued.*

Streams (Flow of) and Storage. Fitzgerald, 1892.
Sunspots and Rainfall. Meldrum, 1878.
Tables of. French (H. F.), 1884.
Water Supply, Rainfall and evaporation in relation to. Leslie, 1871.
Africa (South). Gamble, 1878; Tripp (W. B.), 1886, 1892, 1842–86. Tripp (W. B.).
—— Physical Configuration and rainfall. Tripp (W. B.).
America (South). Rainfall south of the Tropics. Tripp (W. B.), 1889.
Australia. Natural law of relation between Rainfall and Vegetable Life and its application to. Velschow (F. A.), 1888
Australia (South). Average Rainfall, 1839–74. South Australia, p. 228.
Barbadoes. Influence on the Sugar Crops, 1847–71. Rawson (R. W.), 1874.
Brisbane, 1860–1890. Brisbane.
British Isles. Rainfall Tables of the, for 1866–80. Meteorological Office, p. 348.
—— British Rainfall, 1860, etc. Symons (G. J.)
Calcutta. Diurnal variation. Blanford, 1885.
Cape Town. Gamble, 1884.
Ceylon. Observations, 1880–82. India, p. 115.
—— Amount and distribution of Monsoon Rainfall, with remarks on the Rainfall in Dimbula. Waring (F. J.), 1887.
Cochituate (Lake), Mass., 1852–83. Fitzgerald (D.), 1884.
France. Distribution of Rain. Delesse, 1868.
—— South West of (Aquitaine and Pyrenees). Raulin, 1864, 1866.
Glasgow, Manchester, Ashton, Dewsbury, Halifax, Blackburn, Stockport, Oldham, and Batley Waterworks districts. Bateman (J. F. La T.), 1867–88.
Great Britain. Rainfall. Beardmore (N.), 1850, 1852.
Hertfordshire. Half a Century's Rainfall. Hopkinson (J.), F.L.S., 1890.
India. Fayrer (Sir J.), 1883. Add. 500; 1873, '78, '91, etc. India, p. 106.
—— (Northern). Winter rains of. Blanford, 1884.
Loch Katrine district. Glasgow.
Lake and Mountain District, Rainfall in the English, 1851. Miller (J. F.)
Lancashire, Cheshire and Derbyshire. Depth at different altitudes in the hilly districts of. Homersham, 1848.
London District. Dines, 1872.
Manchester (around), annual depth. Homersham, 1848.

RAINFALL (General References)—*continued.*

New South Wales. Rain Observations, 1878.
New South Wales, p. 402.

—— Rain and River Observations, 1879–85, '86, etc.
New South Wales, p. 402.

Oxford. Remarks on the proportionate quantities of rain at different seasons in. Rigaud (S. P.), 1835. Rigaud, 1835. App. 573.

Rochdale, Ashton-under-Lyne and Peak Forest Canals, along the lines of the. Bateman (J. F. la T.), 1845; Clare (P.), 1854.

Queensland. Mackay, 1871–91; Queensland, 1886, p. 70.

—— Diagram of Rainfall at Townsville, 1871–91. Townsville.

—— Map showing mean annual Rainfall to end of 1890.
Queensland, p. 71

—— Rockhampton, from 1871–1891.
Rockhampton, Queensland, 1892.

Severn fishery district. Tables showing rainfall, temperature and height of the rivers. Severn (River), 1886, p. 185.

United Kingdom. Advantages of a daily register throughout the United Kingdom. Denton (J. B.), 1858.

Wiltshire. Rainfall, 1878. Wiltshire, 1879.

RAIN GAUGES. Electric self-recording Rain gauge.
Binnie (W. J. E.), 1892.

RAPE. Products and Cultivation. Brotherton, 1857.

RATING.

Gas and Water Works. Quick, 1880.

Hereditaments. Assessment on, containing Machinery.
Potts (J.), jun., 1879.

Law of Rating. Castle (E. J.), 1879.

London. Rates levied in the Metropolis during 1883.
Lloyd (J.), 1884.

Railways, gasworks, mines, cemeteries, assessment of.
Castle (H. J. and E. J.), 1869.

—— Remarks on the Rating of Railway, Gas, Water, etc., Companies. Penfold (C.) (1860).

REAPING MACHINES. *See* Agricultural Implements.

RECEIPTS. Wrinkles and Recipes. Benjamin, 1870.

RECLAMATION OF LAND.

Account of gaining land from the sea by Polders.
Jackson (G. B. W.), 1846.

Bombay. Proposed road through the reclamations on the Harbour side. Aitken (R) 1866.

RECLAMATION OF LAND—*continued.*

Bombay. Administration Report, 1870–71, etc. INDIA, p. 113.

—— Project for reclaiming land between Bombay and Trombay, 1863. INDIA, p. 113.

India. Elphinstone Land and Press Company. Reports, 1860–76. ELPHINSTONE Land.

Ireland. Reclamation of Waste Lands in.
KINAHAN (G. H.) and McHenry, 1882. Add. 513.

—— Reports on reclaiming various Tide Lands in Wexford and Waterford. VETCH (J.), 1841.

See also DRAINAGE OF LAND.

RECORDS (PUBLIC). Nature, state and preservation, 1800.
PARLIAMENTARY..Papers, p. 510.

REEFS.

India. Alguada Reef Operations, 1861–64. INDIA, p. 109.

—— —— Lighthouse on, 1858. INDIA, p. 109.

REEFS (BARRIER). Directions for the Outer Passage, from Sydney to Torres Strait, to accompany chart of the.
BLACKWOOD (F. P.), 1847.

REFINING. Instruction on the Art of Refining.
ARCET (J. P. J. d') 1827.

REFRIGERATION. *See* COLD AND REFRIGERATION.

REFUSE OF TOWNS.

Application to Agriculture. GUY, 1848.

Destruction of Town Refuse. CODRINGTON, 1888.

Disposal of Town Refuse.
FOWLER, 1884; WARNER (W.), 1888, '93.

Melbourne and Adelaide. Report on the disposal of refuse.
MELBOURNE, 1891.

Treatment. MANLOVE, Alliott, Fryer and Co., 1880.

See also DESTRUCTORS, SANITATION.

REGALIA OF ENGLAND. By Tennant. POLE, 1861.

REGISTRATION. Registration, proposed Act to include Architects, Civil Engineers and Surveyors.
WALKER (Robert), 1887.

RELIGIONS.

Brahmanism, Origin of. HAUG, 1863.

Nángis (Notes on the), a religious sect. PARRY (J. W.), 1883.

Natural evidence of a Future Life. BAKEWELL (F. C.), 1835.

Paganism in Caledonia, Asiatic philosophy, the development of Christianity in Pictavia. WISE (T. A.), 1884.

RESERVOIRS.

Catch-water Reservoirs in mountain districts. BELOE, 1872.

Cost. BIDONE, 1824.

Covered Reservoirs. SWAN (C. H.), 1888.

Dams (Reservoir). AITKEN (R.), 1871–72; GRAVELL, 1887.

Dams of Masonry. CROES, 1875; GRAEFF and Delocre, 1869; MOLESWORTH, 1874; INDIA, 1869; INDIA, p. 113.

Embankments. Building of race and reservoir embankments. LEFFEL, 1874.

Geddis *v.* Bann Reservoir Company. Action for damages against Company for injuries by floods, caused by negligence in management of Water Reservoir. GEDDIS (D.), 1877. Add. 502.

Rain water (Artificial Reservoirs for), for the Irrigation of Land deficient in running water. 1829. CARENA (G.), 1869. Add. 490.

Reservoirs for Water, Oil and Gas according to calculations and conclusions. FORCHHEIMER, 1884.

Treatise on Reservoirs. SUTCLIFFE (J.), 1816.

Walls, Study on Reservoir. KRANTZ, 1870, '83.

Adelaide (North) Reservoir proposed. ADELAIDE, 1878.

—— Estimate for Service Reservoir. ADELAIDE, 1878. Add. 479.

Ajmere district, Tank Embankments constructed, 1844. DIXON (C. D.), 1845; INDIA, p. 109.

Alfeld. Establishment of storage reservoirs in the Vosges, particularly the Alfeld reservoirs. FECHT (H.), 1889, '93.

Bann (River), Reservoirs for supplying the mills with water. FAIRBAIRN (Sir W.), 1836, p. 403.

—— Bann Reservoir at Lough Island. Sketch of its construction and working. SMYTH (J.), 1871.

Bosgah Tank in the Goolburga District, Nizam's Dominions, 1880. INDIA, p. 113; MACFARLANE (T. M.), 1880.

Bradfield failure. Evidence. NAYLOR, 1864.

Burnside, Australian Estimate. BURNSIDE Reservoir, 1878.

California. Destruction of the English Dam, Rudyard Reservoir. BOWIE (A. J.), 1858.

Covington reservoir, reports of engineer. BOUSCAREN, 1888–91.

Dale Dyke. DALE DYKE, 1865, '66.

Denscleugh Reservoir—expediency of constructing. LESLIE (J.) and Cameron, 1876.

Dodder, Reservoirs on the River, co. Dublin, proposed formation for the prevention of sudden floods and accumulation of Water. MALLET (R.), 1844

Doe Park and Bradford Reservoirs. DOE PARK, 1865–66.

RESERVOIRS—*continued.*

Etherow Reservoirs Bill. Report of Surveying officers. ETHEROW, 1847.

France. Canal of the Centre and Burgundy Canal. Reservoirs of Water Supply. FONTAINE (A. J. B.), 1892.

—— South of. BOUVIER, 1892.

Glenelg (Adelaide), estimated cost. GLENELG, 1878.

Haute Marne (Department of the). CADART (G.), 1892.

Hempsted Storage Reservoir of Brooklyn. MCELROY, 1878.

Hope Reservoir, Providence. Contract and Specification. PROVIDENCE, 1873.

India (British). BAROIS, 1892.

—— How to form reservoirs on Indian rivers. APPLEGARTH, 1881.

—— Khushdil Khan Reservoir scheme. PISHIN VALLEY, 1890.

Leith (Water of) and Bevelaw Burn Mills, Report relative to the Compensation Reservoir for. STEVENSON (R.), 1819.

—— Report on reservoirs for supply of Water of Leith Mills. STEVENSON (R.), 1822.

Mitcham, S. Australia. Estimate, 1878. MITCHAM Reservoir.

New South Wales, use, construction, and cost of Service Reservoirs. DARLEY, 1891.

New York State (Carthage). Testimony relative to the failure of a Reservoir above Lyon's Falls and the damage at Carthage resulting therefrom (Griffith, Evans and Co. *v.* State of New York). MCALPINE (W. J.), 1869. Add. 517.

Pacific Coast. Contamination of Waters. LE CONTE, 1890.

Raiyan Reservoir, Notes on. WHITEHOUSE (Cope), 1889.

Rochdale Reservoirs, Correspondence relating to them. ROCHDALE, 1865.

Russia. HOERSCHELMANN, 1892.

St. Helen's Waterworks. Specifications for construction of Reservoir. ST. HELENS, 1877.

Sheffield. DALE Dyke, 1866.

Sockanosset. PROVIDENCE, 1870.

Southwark and Vauxhall Water Company. Reservoir at Hampton. Specifications for a Filtering Screen in it, 1876. SOUTHWARK and Vauxhall Water Co.

Spain. Irrigation Reservoirs. LLANRADO, 1889, '92.

Sydney. Potts' Hill Storage Reservoir and second line of pipes to Crown Street. SYDNEY, 1888, p. 273.

Turin. Esquilino reservoir. VESCOVALI, 1882.

Victoria Reservoirs. Reply as to the amount expended on, what Reservoirs are made, and what in course of construction, etc. VICTORIA, 1861, p. 379.

—— Malmsbury Reservoir. Progress Report, 1870. MALMSBURY.

RESPIRATION. Changes produced on Atmospheric and Oxygen Gas by. ALLEN, W., and Pepys, 1808.

REVENUE.

Cape Colony. Sources of Revenue. CAPE Colony, 1884–87, p. 222.

India. Revenue Settlement. Districts of Omerkote and Thurr, 1856. INDIA, p. 131.

—— Madras. Commutation Rates, 1856. INDIA, p. 125.

—— Revenue Survey, 1858, '60, '63. INDIA, p. 125.

—— Revenue Administration. Report, 1859–60. INDIA, p. 125.

RIVERS (GENERAL REFERENCES). BOILEAU (P.), 1878, 1881; BRECKENRIDGE, 1885; ERSKINE, 1770; GUGLIELMINI, 1697, 1739.

Advantage of rendering British Rivers Navigable. YARRANTON, 1677.

Artificial banks of a navigable river with movable bottom. FARGUE, 1892.

Bottoms of Rivers. NEPVEU, 1860.

Bournes. FRENCH (H. H.), 1883.

Canalisation (object and use of). BOULÉ, 1888.

Conservancy of Rivers. BLAKE, 1881; EASTON (E.), 1878; MOLYNEUX, 1879. Conservancy of Rivers Bill, 1883. PARLIAMENTARY..Papers. Add. 527.

Conservation and improvement of tidal rivers. CALVER, 1853.

—— Report of Select Committee on Conservancy Boards, 1877. PARLIAMENTARY..Papers, p. 473.

Course of Rivers. GENNETÉ, 1760. Legislation. GENIEYS, 1830.

Damming of Rivers. COMOY, 1861.

Deepening and cleaning of Rivers. BREMNER, 1845; HOCHENBURGER (F. R. von), 1886.

—— Patent Hydraulic Deepener. AFFLECK, 1833.

Discharge of rivers, formula for mean velocity of. KUTTER, 1873, '76.

—— Calculating the velocity and discharge of Rivers, Rules for. LALL (K.), 1858, '66.

—— Calculating the Discharge, Inclination and Dimensions of River Courses and Drains, Tables for. MANNING (R.), 1852.

Dredging (Steam) engine. Use in deepening the rivers in the Bedford Level. ARCHER (T.), 1829.

Embankment. PAGE (Sir T. H.), 1801.

Engineering (River). VERNON-HARCOURT (L. F.), 1886.

Formation and existence of streams, rivers, and torrents. LECREULX, 1804.

RIVERS (General References)—*continued.*

Gauges in shifting rivers. Bellasis, 1873.

Geographical importance of rivers, and their development as commercial highways. Honsell (M.), 1888.

Hydraulique fluviale. Lechalas, 1884.

Hydrology. Lombardini, 1870.

Improvement (Rivers). Plans. Tayler (Capt. J. N.), 1840.

Improvement of the maritime portion of Rivers; including their outlets. Vernon-Harcourt (L. F.), 1892.

Improvement of River Mouths. Corthell, 1892.

Improvement of the Navigation of Rivers. Brooks (W. A.), 1841.

Improvement of the navigation of rivers by the adoption of moored floating constructions as breakwaters. White (John), 1840.

Management of Rivers. Denton (J. B.), 1881.

Movement of water in rivers. Hagen (G.), 1868.

Maritime portions of rivers, tides. Calard (P.), 1861.

Nature of rivers. Guglielmini, 1697, 1739.

Navigation of Rivers. Beaudemoulin, 1860.

Navigability. Janicki, 1880.

—— Means of rendering rivers navigable. Anonymous, 1696, p. 57.

—— Work connected with Navigation. Minard, 1841.

Papers relating to Rivers. Page (Col. F.), 1843. Add. 525.

Passage of Rivers, in Military Operations. Douglas (Sir H.), 1816, 1853.

Prevention of floods. Fabre, 1797.

Problems in River Physics. Johnson (J. B.), 1885.

Reforesting of hills and uplands. Effect upon rivers by the. Cooper (R. T.), 1886.

Reform, Practical River. Burness, 1882.

Regimen of Navigable Rivers. Garnier (F.), 1822

Regulation. Brunings (C.), 1780; Dalmann (J.), 1856; Hübbe (H.), 1853.

Regulation of Mountain Torrents. Hess, 1876.

Regulation of Water Courses, with intermittent discharge. Beau de Rochas, 1889.

Statistics. Lombardini, 1856.

Systematizing Rivers. Valentini, 1893.

Temperature, River, daily changes and methods of observation. Guppy (H. B.), 1894. Add. 504.

Tidal action in Rivers. Caland (P.), 1861.

Tidal Rivers. Entrance to them. Scott (A.), 1892

—— Their hydraulics, improvement, etc. Wheeler (W. H.), 1893.

RIVERS (General References) *continued.*

Tidal improvement. Franzius, 1892; Haupt (L. M.). Add. 506.

—— Illustrated by reference to works executed on the Tay, Ribble, Forth, Lune, etc. Stevenson (D.), 1845–49.

—— Navigation of Tidal Rivers. Bouniceau, 1845.

—— Phenomena. Boult (J.), 1891.

—— Physical Conditions affecting, and the principles applicable to their improvement. Vernon-Harcourt (L. F.), 1890.

Tidal Rivers and their estuaries. Partiot, 1892.

Tidal Waters and Running Streams. Inquiry into their operation. Taylor (J. T.), 1851.

Tidal Estuaries, Principles of training rivers through, as illustrated by the Seine. Vernon-Harcourt (L. F.), 1889.

Torrents (Rivers and), Method of regulating their course and Channels. Frisi, 1774, 1818.

Treatise on Rivers. Vernon-Harcourt (L. F.), 1882.

See also Bars at River-mouths, Estuaries, Inland Navigation.

RIVERS (Pollution of). Coke, 1874; Folsom, 1877; Hering (R.), 1888; Phosphate Sewage Company, 1874; Potter (E. C.), 1875.

Acts. Rivers Pollution Prevention Act, 1876. Alkali Acts, 1863, 1874. Lumley, 1876.

—— Reports to Local Government Board on the River Pollution Prevention Act, 1876. Parliamentary..Papers, p. 511.

—— Report by the Inspector for Scotland under the Act. Scotland, 1888, p. 175.

Bills, 1873, 1875, 1881, 1885. Report of Select Committee, 1873. Parliamentary..Papers, p. 510.

Cleansing of Rivers. Austin (C. E.), 1872.

Commissions, 1865, 1868. Reports of Commissioners. Parliamentary..Papers, p. 510.

Hygienic aspect. Page (Dr.), 1876. Add. 525.

James' Air Process, Purification of Sewage by. James (S. H.), 1888.

Legislation, Pollution. Hodgson (J. S.), 1881.

—— Legislation to restrain it, what should be its extent? Scott (Gen. H. Y. D.), 1874.

Pollution. Robinson (Prof. H.), 1883, 1885.

Purification. River Pollution and River Purification. Roechling (H. A.), 1892.

RIVERS (Pollution of)—*continued.*

Purification of River water from Town Sewage. The Sewage Committee of 1864 and its report.
Spencer (T.), 1865, p. 237.

Report. Kirkwood, 1875.

Self-purification. Frankland (P. F.), 1891.

Sewage of rivers and estuaries. Prevention of the pollution by.
Crimp, 1890, 1894.

Sewage Disposal. Robinson (Prof. H.), 1891.

Unpolluted Streams. Coode, 1858.

Water Courses. Law relating to the pollution and obstruction of.
Higgins (C.), 1877.

Aire and Calder. Pollution, how to deal with it.
Paterson (M. M.), 1893.

Cam. Purification. Report. Rowe (R. R.), 1865.

Clyde. Purification. Clyde, 1876. Glasgow, 1868.

—— Effect of the refuse matters of the St. Rollox Works on the Water. Anderson (T.), 1865.

—— Clyde at Glasgow. Muir, 1884.

—— Purification and Improvement of. Struthers (J.), 1891.

—— Purification. A letter to the Provost of Glasgow.
Scott (M.), 1868, p. 177.

Hyndburn and its tributaries, with particulars of the various polluting agencies. Newton (W. J.), 1891.

Lancashire and Cheshire Rivers, Pollution of. Report.
Roscoe (Sir H. E.), 1892.

Lea (River). Report of Select Committee, 1886.
Lea (River).

Medlock, practicability of purifying the water flowing into the Duke of Bridgewater's Canal, 1856.
Manchester and Salford Sanitary Assoc.

Rhymney, Taff and Ely, Pollution of. Frazer (W.), 1890.

Ribble. Nature and treatment of Manufacturers' Waste Effluents.
Naylor, 1893.

Seine purification and the Paris Sewage water utilized.
Bergeron (Dr. G.), 1876 ; Bourneville, 1887 ;
Stoffel (L. M.), etc., 1873.

Thames. Sewage Contamination. Odling (W.), 1858.

—— Reports upon the condition of the river with reference to the allegations of Capt. Calver.
Bazalgette (Sir J. W.), etc., 1878.

—— Conservancy rejoinder to the reports of Sir J. Bazalgette on the allegations made against the sewage outfalls at Barking Creek and Crossness. Calver, 1878.

RIVERS (POLLUTION OF)—*continued.*

Thames. Shoals formed by mud from the sewers. Observations on reply to Calver's report. BURSTAL, 1878.

—— Filth in the Thames. FORTUNE, 1834.

—— Gurney's plan for purification. Report. THAMES (River), 1858, p. 296.

—— Martin's plan for rescuing it from pollution. Report. THAMES (River), 1836, p. 296.

—— Mode for purifying. EVANS (G.), 1870.

—— Returns relative to operations performed for preventing the occurrence of noisome effluvia. THAMES River, 1859, p. 296.

—— Thames Pollution Commission. Reductions of Observations on the Thames, etc. UNWIN (W. C.), 1866, p. 360.

—— Thames purification. PHILLIPS (J. O.), 1885.

—— Will it be purified under the new Act? WORSLEY (Sir W.), 1858.

—— Pollution by the discharge of sewage. RAWLINSON (Sir R.), 1869.

—— Pollution by sewage. Correspondence. THAMES (River), 1884, p. 297.

—— Discharge of metropolitan sewage into the river. CALVER, 1877.

—— Report on its pollution by the discharge of sewage through the northern main outfall sewer. THAMES, 1869, p. 297.

—— Pollution by the sewage of riverside towns. NELSON (T. J.), 1879.

—— Sewage kept for use and rivers kept clean. SPURGIN (J.), 1858.

—— Thames Sewerage Commission. Bill for the purification of the Thames between Windsor and London. THAMES Valley, 1872, p. 299.

—— Stevens plan to Purify. STEVENS (F. W.), 1858.

Trent, purification. TARBOTTON (M. O.), 1875.

United Kingdom. Pollution of the Rivers. FISHERIES Preservation, 1868.

RIVERS (STEAM POWER ON).

Steam Towing by means of a submerged cable. MEYER and Wernigh, 1876.

Steam traction. BUQUET, 1868.

RIVERS (AFRICAN).

Buffalo River, Cape of Good Hope. Report. TRIPP (W. B.), 1882.

Nile. COTARD, 1884; SOCIÉTÉ d'Études du Nil, 1889.

—— Barrage of the Nile. MOUGEL, 1850.

RIVERS (AFRICAN)—*continued.*

Nile. Delta of the Nile and the true position of Pelusium and Farama. NILE, 1860.

—— —— Effect of wave influence on the deposits of the Nile. SPRATT (T. A. B.), 1859.

—— Law of the variations of superficial inclinations. MANOUG, 1886.

—— Nile Flood, 1892. NILE.

—— Hydrology. LOMBARDINI, 1865.

—— Report on Irrigation and Inundation. VYSE (G. W.), 1878.

—— Journey to Kaffa to discover the source. BEKE, 1851.

—— Recent Nilotic discovery. BEKE, 1851.

Vaal River at Kimberley, Levels of. TRIPP (W. B.), 1892.

RIVERS (AMERICAN).

Amazon, route to Bolivia, *viâ*. CHURCH (G. E.), 1877.

—— Amazon and Madeira. KELLER, 1874.

—— Up the Amazon and Madeira Rivers through Bolivia and Peru. MATHEWS, 1879.

America (North). River navigations. HAIG, 1863.

Assiniboine River. Water power and Navigation. RUTTAN (H. N.), 1888.

Brazos River, Texas, survey at the mouth. BRAZOS River, 1888.

—— Improvements at the Mouth. HOWELL (C. W.), 1872.

Canada. Water Highways. BLACKWELL (T. E.), 1874.

Charles River, Mass., Report on the Improvement of, from the Waltham Line to the Charles River Bridge. CHARLES River, Mass., 1894. Add. 491.

Colorado River. The Cañons. STANTON (R. B.), 1890–93.

—— Exploration, 1857–58, 1869–72. COLORADO.

Columbia (Upper) River and the territory in its vicinity in 1881. Report of an Examination. SYMONS (Capt. T. W.), 1882.

Delaware, removal of the five mile bar. HAUPT (L. M.), 1887.

Hudson River, tunnelling under. BURR (S. D. V.), 1885; SMITH (William S.), 1882.

James River and Kanawha Company. Reports, 1839, '75. JAMES (River).

—— Central Route from the Mississippi to the Atlantic, 1874. JAMES (River).

Johnstown, Pennsylvania, Rivers at. Report, 1891. CROES.

Kanawha. Improvement by means of Artificial Lakes. ELLET (C.), jun., 1858.

Maule and Valdivia. Chile. CORDEMOY, 1893

Mississippi basin, Hydrological Conditions of. REID (R. C.), 1885.

RIVERS (AMERICAN)—*continued.*

Mississippi. Bars, removal of, at the mouth.
PUTNAM (J. R.), 1841

—— Bridge (Proposed) across it at St. Louis. ST. LOUIS, 1867.

—— Caving Banks. HARROD, 1886.

—— Commerce. MORGAN (G H.), 1893. Add. 521.

—— Commission for 1882. MISSISSIPPI. Lever and outlet systems. COWDON, 1883.

—— Delta considered in relation to an "open river mouth." BARNARD (E. G.), 1875.

—— Protection of delta. ELLET (C.), jun., 1853.

—— Hydraulic experiences. FOURNIÉ, 1867.

—— Improvement. COMSTOCK, 1892.

—— Improvement below Cairo.
COMSTOCK (C. B.), 1893. Add. 493.

—— Improvement of the South Pass of the River.
MISSISSIPPI, 1875–78, '82–83.

—— Jetties at the Mouth. CORTHELL, 1880.

—— South Pass Jetties, Acts of Congress relating to, 1875.
MISSISSIPPI. Add. 521.

—— Mouths, Correspondence. HARTLEY and others, 1874–75.

—— Mouth of the Mississippi, navigable canal, works.
MISSISSIPPI, 1875, '79.

—— Overflow. BRIDGES, 1882.

—— Physics of the river. FORSHEY, 1850.

—— Physics and Hydraulics. EADS, 1874;
HUMPHREYS, A. A., and Abbot, 1867, '76, '78.

—— Plan for the reclamation of the alluvial basin of the River subject to inundation. MISSISSIPPI, 1875.

—— Transportation Routes to the Seaboard. MISSISSIPPI, 1879.

Missouri, regimen of. CHANUTE and Morison, 1870.

—— Bellefontaine Bluffs. Specification for a Viaduct in the North Approach to the bridge across the Missouri.
MORISON (G. S.), 1892. Add. 521.

Mystic, Blackstone, and Charles Rivers, Report on general system of Drainage for Valleys of.
MASSACHUSETTS, 1886. Add. 519.

New York City and Northern New Jersey. Annual Report upon the Improvement of Rivers and Harbours in the vicinity of. UNITED States, 1886, p. 356.

Ohio. Cost of improving Navigation. ELLET (C.), jun., 1853.

—— Improvement by means of Artificial Lakes.
ELLET (C.), jun., 1858.

Paraná, Uruguay, and La Plata Estuary, Hydraulics of great Rivers. RÉVY (J. J.), 1874.

Peru. River Rimac. LASTARRIA, 1876.

RIVERS (AMERICAN)—*continued.*

Rio de S. Francisco, exploration. HALFELD, 1860.

Sacramento River. Drainage District. Report. SACRAMENTO River, 1879.

—— Improvement of. HALL (W. H.), 1880.

—— Promotion of rapid drainage and improvement of Navigation. EADS, 1880.

St. Charles River, Quebec; proposed dry dock at the mouth. BAILLAIRGÉ, 1876.

St. Charles River, Quebec. Report of the Quebec Engineer on proposed improvement at its mouth. ST. CHARLES (River), 1875.

St. Lawrence. HARTLEY (Sir C. A.), 1886.

—— Hydrology of the basin. BLACKWELL (T. E.), 1866.

—— Improvements in its navigation. Report. ST. LAWRENCE (River), 1856, 1875.

—— Railway Bridge over, near Quebec. SORRELL (W.), 1852.

St. Peter (Lake), and River St. Lawrence, deepening of the Ship Channel in. MONTREAL, 1855.

Schuylkill Navigation Co. on the improvement of the Schuylkill navigation. Report. MILLER (E.), 1845; ROBERTS (S. W.), 1845.

Sudbury. Yield of the Sudbury River Watershed in the freshet of Feb. 10th to 13th, 1886. FITZGERALD (D.).

United States and Canada, Notes on chief navigable rivers in. WALCH (G. T.), 1877.

Wisconsin and Fox Rivers, Report on the, Transportation route along. WISCONSIN, State of, 1876.

Yellowstone River, Reports of Explorations of. YELLOWSTONE River, 1868, '69, '72, '73.

Yukon River Reconnaissance. Report. YUKON (River), 1871.

RIVERS (ASIATIC).

Amu, change of its course by which its mouth has been transported from the Caspian to the Aral. WOOD (Herbert), 1875.

China. Rivers of "Chih-li" and the Floods during the summer 1890. LINDE (A. de).

—— Tsien-Tang Kiang (Hang-Chau Bay). The Bore. MOORE (W. U.), 1889.

Euphrates the road to the East. BROOKS (W. A.), 1857.

—— Euphrates River during the expedition of the armed steamer "Euphrates." WINCHESTER (J. W.), 1838.

—— Euphrates and Tigris Surveys. CHESNEY (F. B.).

Rumpen River. Report on a visit to a portion of the Country drained by. SWINNEY (A. J. G.), 1889. Add. 535.

Tigris to Bagdad. WEBB (F. C.), 1870.

RIVERS (AUSTRALASIAN).

Australia (South). MURRAY, 1883.

Bowen River. Bowen Jetty and Mackay Improvements, Queensland. BOWEN River, 1877.

Brisbane. Dredging. BRISBANE, 1877.

Canterbury, New Zealand, Plains and Rivers. DOYNE, 1864.

Clarence, New South Wales, proposed improvements to the entrance of the River. CLARENCE, 1890.

Clutha, New Zealand, floods. CLUTHA, 1880.

Darling River, N.S.W. Report on. DONKIN (J. B.), and Gipps, 1887.

—— Utilization of. DARLING, 1893.

Fitzroy River, Queensland. Reports. FITZROY, 1877, 1888.

Leven River, Tasmania. Report. LEVEN River, 1890.

Mackay, Townsville, Queensland. COODE (Sir J.), 1887.

Mary River, Queensland. Dredging, 1877. Survey, 1888. MARY (River).

Mary and Burrum Rivers, Proposed Railway or Tramway between. MARY (River), 1878.

Mersey River, Tasmania. Report on entrance, 1890. MERSEY River.

Murray River, N.S.W. Map of Drainage Area. MCKINNEY, 1891.

—— Report. MURRAY River, 1889.

New South Wales. Rivers. MCKINNEY, 1888.

—— Exploration of Caves and Rivers. Reports. NEW SOUTH WALES, 1882, p. 400.

Norman River, Gulf of Carpentaria, Queensland. Survey, 1885. NORMAN (River).

Port Curtis, Queensland. PORT CURTIS, 1875.

Queensland. Report. QUEENSLAND, 1865, p. 71.

Rakaia, New Zealand, Headwaters of the River. Report. HAAST, 1866.

Rangitata, New Zealand. RANGITATA, 1872.

Richmond River. Report on the proposed improvements to its entrance. RICHMOND River, N.S.W., 1889.

Ringarooma Canal scheme, Tasmania. RINGAROOMA River, 1885.

—— Tin deposits in its vicinity. RINGAROOMA River, 1884.

—— Ringarooma Water-Race. RINGAROOMA River, 1885.

Snowy River, Proposal to divert Water from the, into the Murrumbidgee and Lake George, New South Wales. DONKIN (J. B.), 1887.

Taieri River. Report on Floods. TAIERI (River), 1880.

Waimakariri, New Zealand. DOYNE, 1865.

—— Encroachments. CANTERBURY, N.Z.

Wanganui River, New Zealand. Report by Mr. Blackett. WANGANUI River, N.Z., 1873.

Yarra River Floods. Report. YARRA (River), 1892.

RIVERS (British).

Adur. Improvement of Adur Navigation. Adur, 1807.

Aire and Calder Acts, 1774–1820. Aire and Calder.

—— Classification of Merchandise Traffic Bills. Aire and Calder, 1893.

Aire, at Leeds, Account of the building of the "Wellington" Bridge over. Timperley (J.), 1844.

Arun. Improvement of the Navigation Act. Arun, 1785.

Avon. Dockising the River. Bristol, 1881; Howard (T.), 1879–81.

Bain. Act for making the river navigable from Tattershall to Horncastle. Horncastle, 1792.

Bann. Act for the improvement of the navigation. Bann, 1817–36.

—— Bann Drainage Bill. Bann, 1889.

Bann (Lower). Improvement of the navigation. M'Cleery, 1836.

—— Means of making it navigable. Macneill, 1836.

Bann (Upper) River. Its industrial uses. Smyth (J.), junior, 1875.

Barrow. Estimate of the expenses of completing the navigation of the river from St. Mullin's to Athy. Chapman (W.), 1789, p. 241.

—— Means of perfecting the Navigation from St. Mullins to Athy. Chapman (W.), 1789, p. 242.

Bedford Level, Navigable Rivers of the. Badeslade, 1766.

Boyne. Advantage of a navigation to extend from Dublin to the Northern Counties of Ireland and to the South by a communication with the Grand Canal. Boyne, 1801.

Burnett River. Works necessary for its improvement. Burnett River, 1878.

Bury, Lougher and Shedi Rivers Improvement Act, 1813. Bury (River).

Cart. Report of Committee on the River Cart Survey. Cart, 1854.

Cham. Amended Act for the improvement of the River Cham. Cham, 1813.

Clyde. Deas, 1884; Quinette de Rochemont, 1869; Richardson (Joshua), 1836.

—— Plans for preventing accidents on board steam vessels. Clyde, 1839.

—— Arbitration between Lord Blantyre and the trustees of the Clyde Navigation. Blantyre, 1885.

—— Report on the banks and bed. Deas (J.), 1880. Add. 495.

—— Deepening, widening and improving the river. Deas, 1885.

RIVERS (British)—*continued.*

Clyde. Explosion of Dynamite off Gravel Point, near Greenock, 1881. Clyde.

—— Means of improving and extending the Steam Packet Communication between Clyde and the West Highlands. Thomson (William), 1834.

—— Improvement of. Bell (D.), 1837; Logan, 1835; Clyde, 1755–1869. Above Port Glasgow. Deas, 1887. Between Jamaica Street bridge and the Glasgow Waterworks. Bald (W.), 1839.

—— Navigation. Deas, 1871–79, '92; Ure (J. F.), 1854. Amended Act. Clyde, 1809. Bill. Minutes of Evidence. Clyde, 1840.

—— Report to the Parliamentary Trustees for improving the Navigation of. Walker (James), 1841, p. 394.

—— Report on Quay Walls. Walker (James), 1860, p. 393.

—— Silting of the river Clyde at Port Glasgow. Robertson (G.), 1878.

—— Tidal Velocities between Glasgow and Greenock. Deas, 1884.

—— Weirs across the Clyde at Glasgow. Deas, 1886. Removal of Weir. Page (T.), 1865.

Colne Navigation. Bruff (P.), 1842. Report. Wheeler (W. H.), 1894.

Crouch and Blackwater, improvement of. Essex, 1851.

Dee River in Cheshire. Report on the past and present state of. Walker (James), 1849, p. 394.

—— Improvement of the River. Chester, 1839; Rennie (Sir J.), 1837; Russell (John S.), 1838.

—— Navigation Act for confirming agreement between Proprietors and Lords of Manors. Dee, 1791.

—— Improvement, Chester. Admiralty Inquiry. Dee, 1849.

—— Plan of improving. Dee, 1839.

—— Report upon River Dee Navigation Improvements. Dee, 1850.

Dee and Mersey. Tidal gauge table for navigating. Denham, 1840.

Don. Best plan of bringing the Navigation from the River Don to Sheffield. Sheffield, 1814. Add. 533.

Doon. Salmon Fishings and Mill power. Leslie (J.) and Shaw, 1855.

England. Map of Navigable Rivers. Bradshaw (G.), 1820.

—— River Basins. England and Wales in County Council groups. Map. De Rance, 1893.

Forth and Clyde Canal. Smeaton (J.), 1768, p. 208.

—— Navigable communication between the firths of. Brindley, Yeoman and Golborne, 1768.

RIVERS (British)—*continued.*

Forth and Clyde Canal. Practicability of a tunnel under the Forth near Queensferry. Forth, 1806.

Foss, Yorkshire. Navigation. Birkinshaw, 1852.

Froome. Hints for Improvement. Lunell, 1845.

Great Britain. Priestley (J.), 1831; Skrine (H.), 1801.

Hull, proposed branch Navigations from. Chapman (W.), 1800, p. 243.

—— Acts for improvement of the river. Hull (River), 1801–17.

—— Report of Committee of Owners of property on both sides of the river. Hull (River), 1836.

Humber. Survey of the entrance to the River. Hewett, 1841.

—— Tidal and Engineering features. Hurtzig, 1884.

Irwell. Map of the Mersey and Irwell and their tributaries, 1877. Irwell (River).

—— Improvement of the Mersey and Irwell Navigation, 1841. Mersey.

—— Map of the Mersey and Irwell and their tributaries, 1877. Mersey.

—— Mersey and Irwell Watershed, 1891–93. Mersey.

—— Report on floods in. Whitaker (W. H.), 1881.

Itchin. Amended Acts for its improvement. Itchin, 1795–1820.

—— Navigation. Hollis, 1809.

Kennet and Avon Navigation. Ouse, 1891.

—— Particulars relative to the Transport of Goods on. Page (Col. F.), 1810. Add. 525.

Lagan. Act for amending Acts for the improvement of Navigation. Lagan, 1814.

—— Improvement of the River. Bretland and Bazalgette, 1886.

Lark. Amended Act for the improvement of the River Lark. Lark, 1817.

Lea. Flower, 1887, '93.

—— Acts for improvement of Navigation, 1757–1805. Lea (River).

—— Navigation. Commercial Road Bridge, Specification, 1853. Lea (River).

—— Lea Conservancy and Hertford, Hoddesdon, etc., 1884–86. Lea (River).

—— River Lea Trust Bill, 1850. Lea (River).

—— Improvement of River Lea navigation. Beardmore (N.), 1859. Proposed. Rendel (J. M.), 1850.

—— Report. Rennie (J.), 1804.

London (West of) Navigation. Allnutt (Z.), 1815.

Lune. Amended Act for Navigation, 1807. Lune.

RIVERS (British)—*continued.*

Lune. Report relative to the works executed for the improvement of its navigation. Stevenson (D.), 1851.

Manor and Lyne Rivers, Reports relative to. Stevenson (D. and T.), 1873.

Medway. Act for improving the Navigation. Medway, 1802.

—— Rules, etc., for fishing in. Thames (River), 1846, p. 294.

Mersey. Vawser (R.), 1876.

—— Acts. Webster (Thomas), Q.C., 1848.

—— Cause of the late extraordinary changes in the bed of the river. Jevons, 1828.

—— Buried valley. Reade, 1872.

—— Charter, 1861, '71, '81. Mersey.

—— Deterioration of the Mersey. Boult (J.), 1874.

—— Proposals for a deep-water entrance into George's Basin. Ellacott (J.), 1863. Add. 498.

—— Report on Gunpowder Magazines on the River Mersey, 1890. Mersey.

—— High and low water features between the Rock Lighthouse, Bootle Bay, Garston and Eastham, 1842–57. Mersey.

—— Improvement of Navigation, 1841. Mersey.

—— Navigation of Mersey. Evans (G.), 1844, 1853, '68, '70, '75.

—— Post-glacial geology of the estuary. Reade, 1872.

—— Reports on the present state of the navigation, 1844–79. Mersey.

—— Report on its present state. Richards (Sir G. H.), 1893.

—— Report and Memoir of the surveys, 1860–61, 1871. Hills (G. H.).

—— Report of Mersey Inquiry Committee, 1856. Mersey.

—— Tides. Shoolbred (J. N.), 1875.

—— Mersey Papers, tidal range and tidal column. Webster (Thomas), Q.C., 1875.

—— Phenomena of tidal rivers illustrated by those of the Mersey. Boult (J.), 1891.

—— Training Walls, Investigations into the effects of, in an Estuary like the Mersey. Vernon-Harcourt (L. F.), 1890.

—— Upper Waters. Spinks (W.), 1884.

Mersey and Irwell. Act for making the rivers navigable, 1794. Mersey.

—— Between Liverpool and Manchester. Improvement. Palmer (H. R.), 1840.

—— Map of the Mersey and Irwell, and their tributaries, 1877. Mersey.

RIVERS (British)—*continued.*

Mersey and Irwell. Mersey and Irwell Watershed, 1891–93. Mersey.

Nene. Proposed Bridge over. Rennie (J.), 1819.

—— Drainage of the Nene Valley, 1848. Nene.

—— Improvement. Rennie (Sir J.), 1840.

—— Act for the Improvement, 1794. Nene.

—— Improvement Bill. Minutes of Evidence, etc. Wisbech, 1877.

—— Report on the improvement of the navigation. Rennie (Sir J.), 1837, 1840.

—— Improvement from Peterborough to the Sea. Page (T.), 1860.

—— Improvement Scheme, 1870. Nene.

—— Report on scheme for its improvement. Usill (G. W.), 1874; Stephenson (R.), Bidder, etc., 1858.

—— Local Inquiry, 1862. Nene.

—— Amending the outfall. Edwards (L.), 1771.

—— Improvement of the outfall of the river, 1821. Nene.

—— Improvements of the Nene Outfall in reference to the drainage of South Holland. Carter (J. R.), 1822. Letter to Captains Vetch and Washington on. Wing (T.), 1849.

—— Thorney Lordship. Coode (Sir J.), 1874.

—— Nene and Wisbech Rivers. Report on their improvement. Stephenson (R.), 1848.

Norfolk and Suffolk, Rivers and Broads of. Brittain, 1887; Davies (G. C.), 1887, 1891.

Ouse (Sussex). Act for improving the navigation, 1790. Act for enlarging the powers of two Acts, 1814. Ouse (Sussex).

Ouse. Below Denver Sluice. Walker (James), 1842, p. 394.

—— Condition before and after the erecting of Denver sluices. Ouse, 1721.

—— Improvement of the drainage and navigation by executing a straight cut from Eau brink to King's Lynn. Mylne (R.), 1792.

—— Improvement. Report. Abernethy (J.), 1876.

—— Report on the Improvement of, between Denver Sluice and the Eau Brink Cut. Wheeler (W. H.), 1884.

—— Improvement of the outfall. Golborne, 1791.

—— Necessity of the proposed cut from Eau Brink to Lynn. Ouse, 1793.

—— Navigation. Ouse, 1891.

—— Outfall. Ouse, 1882.

—— Report for amending the outfall of, by a new Cut from Eau Brink to Lynn. Watté (J.), 1791.

RIVERS (British)—*continued.*

Ouse. Report on its outfall. Wheeler (W. H.), 1882.

—— Sections of the River. Elstobb, 1776.

Plym. Moorland course. Worth, 1889.

Ribble. Act for the improvement of its Navigation. Ribble (River), 1806.

—— Estuary. Report on the effects of Training Works in. Vernon-Harcourt (L. F.), 1889.

—— Ribble Navigation Commission. Report. Nares, Hartley and Barry, 1889–91.

—— Report on the extension of its navigable channel to the Sea. Vernon-Harcourt (L. F.), 1891.

Rother (River). An Act for its improvement, 1791. Rother (River).

Serpentine River, London. Best means of cleansing it. Report. Serpentine (River), 1860.

Severn. As it was, is, and should be. Williams (E. L.), sen., 1863.

—— Acts for building bridges over the river, and for its improvement, and the extension of the towing path, 1776, '90, '95, '99, 1811. Severn (River).

—— Admiralty Report. Severn (River), 1849.

—— Bill for the improvement of its navigation. Evidence before a Committee, 1841. Severn (River). Report on Bill. Walker (James), 1841, p. 393. Minutes of Evidence, 1849. Severn (River).

—— Severn Navigation Bill. Reports by Captains Bethune and Veitch, 1849. Severn (River).

—— Sudden stoppage and desolation between Coalbrook dale and Buildwas bridge, May 27, 1773. Fletcher (J.).

—— Severn Commission. Reports, Letters, etc. Williams (E. L.), sen., 1849, '52, '65. Reports, 1883, 1889. Navigation, 1892. Marten (H. J.), 1892. Report on the Analogy between the Rivers Seine and Severn and its bearing on the development of Traffic on the latter River. Marten (E. D.), 1894. Add. 518.

—— Estuary. Parkes (W.), 1847.

—— Account of the works for improving the navigation. Williams (E. L.), sen., 1846.

—— Hints for the improvement of its navigation and directions for navigating. Thomas (R.), 1816.

—— Improvements. Transcript of Documents relating to. Telford (T.), 1784–90, p. 288.

—— Report to the Gloucester and Berkely Canal Company on. Williams (E. L.), sen., 1863.

RIVERS (British)—*continued.*

Severn. Navigation. Its improvement. Reports, 1841, '48. Severn, River. Report of Mr. Walker to the Admiralty, 1852. Severn (River).

—— Reduced Survey and section of part of. Townsend (W. H.) and Steedman, 1822.

—— Tidal Phenomena. Beechey (F. W.), 1851.

Shannon River. Acts and reports on the improvement of its navigation. Shannon (River), 1832–50.

—— Description of navigation. Williams (C. W.), 1833.

—— Shannon and Erne. Report on the formation of proposed junction canal between these rivers. Shannon (River), 1839.

—— Improvement of, and the districts through which it flows. Harris (M.), 1876. Add. 505.

—— Improvement and navigation. Shannon (River), 1835. Between Limerick and the Atlantic. Steele (T.), 1828.

—— Reports on Inundations, etc. Shannon (River), 1861, 1863, 1867.

—— Shannon Navigation Act, 1874. Evidence given under the Act. Shannon (River).

—— Navigation and Drainage. Report from a Committee of the House of Lords, 1865. Shannon (River).

—— Navigation from Lough Allen to Killaloe. Chapman (W.), 1791, p. 242.

—— Present state, 1878. Lynam.

—— Reports from the Select Committee of the House of Commons, 1865–68. Shannon (River).

—— Shannon and Suck. Letter relating to their drainage. Shannon (River), 1870. Report of Mr. Lynam. Shannon (River), 1867.

—— Traveller's Map. Grantham (J.), 1830.

Soar. Improvements. Grant, 1873.

—— Act for making it navigable from the Trent to or near Loughborough. Soar (River), 1766.

Steeping River. Outfall. Williams (John E.), 1884.

Stort. Act for making and continuing it navigable, 1766. Stort (River).

—— Act for making it navigable from Bishop Stortford into the river Lee, 1759. Stort (River).

Stour. Act for making it navigable from Manningtree to Sudbury, 1810. Stour (River).

Suck, River. Drainage Act, 1886. Suck (River).

—— *See* above, Shannon.

Swale, River. Navigation Act, 1770. Swale (River).

Tâfe, River. The Pont y tu Prydd over it. Snell (G.), 1846.

RIVERS (British)—*continued.*

Tay, River. Statement on the Bill for improving the Ferries. Tay (River), 1822.

—— Navigation. Miller (John), 1833; Stevenson (R.), and Son, 1834.

—— Report. Cunningham (D.), 1887.

—— Report on embanking the shore or bed of. Walker (James), 1845, p. 393.

Tees. River Conservancy Bill. Report of the Admiralty on. Tees (River), 1851.

—— Navigation improvement Act, 1808. Tees (River).

—— Proposed improvement of the estuary. Murray (John), 1851.

Thames. Between Boulter's Lock and Mortlake. Brindley, 1770.

—— Boulter's lock to Staines. Survey. Mylne (R.), 1793.

—— Chelsea Embankment. Chelsea, 1871.

—— Communications between the north and south of the Thames below London Bridge. Bazalgette (Sir J. W.), 1882.

—— Below bridge. North and south communication. Bramwell, 1884.

—— Condition of the Thames. Bazalgette (Sir J. W.), 1878.

—— Navigation between Deptford and London Bridge. Hall (John), 1827.

—— Thames Encroachments near Durham Yard. Sharp (Granville), 1771.

—— Thames Embankment. Bazalgette (Sir J. W.), 1868. Bennoch, 1857.

—— Arbitration Award between the Duke of Buccleuch and the Metropolitan Board of Works. Buccleuch, 1870.

—— Low level self-made 6½ mile Thames thoroughfare preferable to a high level tax-made 1½ or 1¾ mile thoroughfare. Sewell (J.), 1861.

—— Embankment of north side between Paul's Wharf and Milford Lane, 1767. London Bridge.

—— Estuary and its Alluvium. Spurrell (F. C. J.), 1889.

—— Flow of the Thames. Report. Binnie (A. R.), 1892.

—— Halfway Reach, Deposit in the bed of the river at. Bazalgette (Sir J. W.), 1875.

—— Iffley Lock, removal of. Iffley Lock, 1885.

—— Impediments and obstructions in its navigation. Report. Tatham (W.), 1803.

—— Plan for its effectual improvement. Robinson (H.), 1855.

RIVERS (British)—*continued.*

Thames. Thames and Isis Navigation. Clegram, etc., 1883. Report. Jessop, 1791; Scobell (G.), 1825. Lechlade to Day's Lock. Jessop and Mylne, 1791.

—— Effects which will be produced on it by rebuilding London Bridge. Report. Telford (T.), 1823, p. 287.

—— Bridge or Tunnel for improved communication below London Bridge. Hora, 1884.

—— Improvement, London. Gisborne, 1853.

—— Thames and Metropolis improvement plan, 1846, '49. Report on, 1836. Martin (John).

—— Steamboats between London and Gravesend. Anonymous, 1831, p. 40.

—— London to Gravesend surveyed, 1830–3. Bullock and Burstal, 1856.

—— And the Port of London. Page (T.), 1851.

—— Map, from the source to the sea. Bowles (C.), 1787.

—— Mud deposits. Leach (S. W.), 1878.

—— Observations on the present state and possible improvement of the navigation. Page (Col. F.), 1794. Add. 525.

—— Reduction of the flow of the tide. Wylson (J.), 1860.

—— Navigation. Reports. Mylne (R.), 1791.

—— Dictionary of the Thames from Oxford to the Nore. Dickens, 1882.

—— Three new cuts above Oxford. Mylne (R.), 1802.

—— Past and present condition. Robinson (H.), 1856.

—— Report on the flow of the tide in the River Thames above and below Plumstead. Austin (A.), 1856.

—— Survey between Reading and Isleworth. Rennie (J.), 1794. Observations, etc., relating to the amendment of the navigation. Vanderstegen (W.), 1794.

—— Present State Considered. Vanderstegen (W.), 1794.

—— Laws of the rise and fall of the tide. Airy (Sir G. B.), 1842, p. 20.

—— Monthly means of the highest and lowest diurnal temperatures of the Water. Airy (Sir G. B.), 1882, p. 17.

—— Tidal observations. Burstal, 1856.

—— Tides. Redman (J. B.), 1874–75.

—— Abnormal high tides. Redman (J. B.), 1882.

—— Canal to communicate with Thames at Wandsworth. Banks (E.), 1810.

—— Works on. Erskine, 1707.

See also Rivers (Pollution) Thames.

Tone, River. Act to amend two Acts for making and keeping it navigable, 1804. Tone (River).

RIVERS (British)—*continued.*

Trent, River. Act to amend Act of 1763, 1794. Trent (River).

—— Floods of the Trent Valley at Burton-on-Trent. Molyneux, 1876.

—— Case on behalf of the Bill for improving the navigation of, 1782. Trent (River).

Tweed. Fisheries Acts. Report on. Tweed (River), 1875.

Tyne. Report on proposed canals on each side. Sutcliffe (J.), 1797.

—— Report on proposed canal on north side of. Whitworth (R.), 1797.

—— Tyne Conservancy Local Acts. Copies of Admiralty Reports under Preliminary Inquiries Act. Report of J. Washington and Minutes of Evidence taken before the latter on the Bill. Tyne (River), 1849–50, p. 336.

—— Encroachments on its foreshore. Instructions given to Lt. Calver to report on, and his reports. Tyne (River), 1854, p. 336.

—— History and resources. Guthrie (J.), 1880.

—— Improvement. Brooks (W. A.), 1843, 1876, '81–88. Messent; Walker (James), 1853, p. 395.

—— Improvement Bill. Minutes of Proceedings taken before James Walker. Tyne River, 1852. Minutes of Evidence and Speech on. Tyne (River), 1877.

—— Improvement Commission. Cail, 1877. Letter to Commissioners. Calver, 1852.

—— Comparative charts and sections of the river from Surveys made in 1860 and '75. Tyne, River, 1876.

—— Improvements effected. Calver, 1872.

—— Letter for its improvements. Taylor (T. J.), 1852.

—— Copies of Instruction given to Capt. Vetch, directing him to proceed to the River, and of his subsequent reports. Tyne (River), 1853, p. 336.

—— Navigation Bill, Admiralty Inquiry. Tyne, River, 1850, p. 335.

—— Best means of improving its Navigation. Richardson (Joshua), 1836.

—— Observations on, with a view to the improvement of its Navigation. MacGregor (J.), 1832. Add. 517.

—— Newspaper cuttings relating to. Tyne (River), 1849–53.

—— Tyne piers, construction. Coode (Sir J.), 1877.

—— Reports and observations on, ordered to be printed by the River Committee, March, 1836. Tyne (River).

—— Memorandum and Section of the River, from the Sea to Wylam. Floods of 1856, '61 and '81. Messent.

RIVERS (British)—*continued.*

Tyne, Report of Commissioners on state of river, minutes, etc.
Tyne (River), 1855, p. 336.

United Kingdom, Industrial Rivers. Anonymous, 1888, p. 47.

Ure (River). Act 1820. Ure, River.

Usk and its tributaries. Report on.
Vernon-Harcourt (L. F.), 1883, 1890.

Wash. Report on the 100-feet Wash and Wash Bank.
Rennie (J.), 1812.

—— Report on the plan of Sir J. Rennie for embanking the shores of the Great Wash. Rendel (J. M.), 1840.

—— Channel leading to King's Lynn. Fuller (J.), &c., 1723.

Waveney. Did it ever reach the sea *viâ* Lowestoft?
Edwards (G.), 1879.

Wear (River) Act, 1819, repealing Act of 1809. Wear (River).

—— Bridges over. Balfour (D.), 1886, 1891.

—— Formation of docks on the River Wear at Sunderland.
Rennie (G.), 1832, p. 101.

Wear Improvement. Labelye, 1748; Murray (John), 1849.

Weaver (River) Act, 1807. Weaver (River).

—— Navigation. Effect of Improvements.
Weaver River, 1892. Add. 538.

—— Report on the practicability of improving the Navigation.
Williams (Sir E. L.), 1865.

Welland, River, Improvement Act, 1794 (Outfall).
Welland River

—— Report on the Improvement of the Navigation.
Walker (James), 1839, p. 394

—— Report to the Trustees of the outfall of, on the improvement thereof. Walker (James), 1835, p. 395

—— Navigation. Edwards (S.), 1810.

Wisbeach River. Report on the outfall of. Yeoman (T.), 1769.

Witham. Report on Witham Drainage.
Hawkshaw, 1861, '62, '77.

—— Drainage and Outfall. Wheeler (W. H.), 1877.

—— Witham Drainage Reports. Witham (River), 1877.

—— Outfall Improvement Bill, 1880. Witham (River), 1880.

—— Remarks on the State of the Outfall of.
Wheeler (W. H.), 1867.

—— Witham Drainage, etc. Reports.
Williams (John E.), 1887, 1878, 1884.

—— Witham and Welland. Chapman (W.), 1800, p. 241.
Outfalls, Kingston (J.), 1879

—— Witham, Welland, Nene and Ouse, outfalls of.
Frow, 1864, '66.

RIVERS (BRITISH)—*continued.*

Woodford, River. Means of making it navigable from Lough Erne to Woodford Lough. CHAPMAN (W.), 1793, p. 242.

Wreak and Eye Rivers Navigation Act, 1796. WREAK River.

Yorkshire. PHILLIPS (J.), 1853.

RIVERS (FOREIGN, EUROPEAN).

Adige. Alpine basin of, Mountain Hydraulics. WEBER VON EBENHOF, 1892.

—— Regulation of, in Tirol and Italy. WEBER VON EBENHOF, 1892.

Alps. Torrents of the. ALPS, 1859.

Arno. CHIANA, 1848; GEORGINI, 1854.

—— Projects in the 16th century to preserve Florence from inundations. TOZZETTI, 1767.

—— Profile of the levelling. MANETTI and Renard, 1848.

Austria. PIZZALA, 1888.

Bièvre, river of Gobelins. Purification of the water by drainage. ERAMBERT, 1851.

Belgium and part of France, history and statistics of navigable rivers. LA RIVE, 1835.

Bilbao. Improvement. BILBAO, 1880, etc.

Chiana. CHIANA, 1848.

—— Regulation of the Waters of the Val de Chiana. MANETTI, 1840.

—— Profile of the levelling. MANETTI and Renard, 1848.

Danube. DANUBE; HARLACKER, 1881; PENCK (A.), 1891.

—— Iron Gates. TÜRR, 1886.

—— In Austria. Map. PASETTI.

—— Reports on the Improvements made in the navigation of since 1871 and 1878–93. DANUBE, p. 318; DANUBE (River). Add. 494.

—— Suggestions for improvement between Isatcha and Sulina Entrance. RENNIE (G. B.), 1856.

—— Map of the Danube, between Braila and the Sea, 1870–71. HANSFORD and Kuhl.

—— Condition of its different mouths. SPRATT (T. A. B.), 1858.

—— Mouths, and the improvement of the mouths of rivers in non-tidal seas. STOKES (Sir J.), 1863.

—— Navigability. WEX, 1872.

—— Note on the work of improving the mouth of, and arm of Sulina. VOISIN (Bey), '93.

—— Danube and its trade. STOKES (Sir J.), 1890.

—— Regulation of the Danube. ITZELES, 1880, 1883; LANFRANCONI, 1880, 81.

RIVERS (FOREIGN, EUROPEAN)—*continued.*

Danube. Regulation of the Danube, near Vienna. BLAIR (J. F.), 1869; DANUBE, p. 318. Lecture on the improvement of. WEX (G. von), 1880.
—— Moldau-Elbe Navigation. RUSS, 1884.
—— (Lower). Regulation of Cataracts. GOUDA, 1892.
Doubs. Means to render it navigable. BERTRAND (P.), 1804.
Douro, Bar and Navigation of. CRAWFURD, 1866.
—— Washers' Wharf at the mouth, projected. MOSER, 1876.
Dyle, improvement of the navigation. GORDON (A.) and Atherton, 1832, '37.
Ebro, Rio. EBRO, 1882.
Elbe. HARLACHER, 1881; ITZELES, 1884; MEMEL, 1888.
—— Correction of the Elbe. LOHSE, 1871.
—— Determination of the normal profile. ELBE. Add. 498.
—— Navigability. ELBE-Stromschau-Comm., 1850.
—— Tides. HÜBBE, 1842.
—— Traffic and Tariffs. POLLACK, 1892.
—— Deepening at Altona. HÜBBE, 1851.
—— Elbe and Oder, Traction on. BELLINGRATH and Dieckhoff, 1892.
France. Rivers and Canals. REYNAULD (L.), 1883.
—— Rivers and Canals. WATSON (William), 1892.
—— Floods in the principal rivers, 1876. BELGRAND and Lemoine.
—— Principal rivers. LECREULX, 1804.
—— Ourcq, Thérouenne, Beuvronne, &c. GAUTHEY, 1803.
Garonne. Basin of the Garonne. GARONNE, 1879.
—— Improvement of the Pass of Bec d'Ambés. GÉRARD, 1893.
Gironde. Notes on the Pointe de Grave. BIXBY, 1881.
Gironde and Garonne. Passes of. PASQUEAU, 1892.
Guadalquivir, Spain. Navigation. CORROZA, 1859.
———— Valley of. MESA, 1864–65.
Holland. HOLLAND, pp. 65–66.
—— Best means of preventing injury from the overflow of Rivers. HOLLAND, 1827.
Hungary. Regulation of rivers. HUNGARY, 1879.
Italy. ITALY, p. 148.
—— Canalisation of Rivers. Bologna and Romagna. CONTI, 1766.
La Plata, Analysis of the Water. KYLE, 1872, '74.
Lambro (Southern). SORMANI, 1889.
Lamone. LANCIANI, 1873.

RIVERS (FOREIGN, EUROPEAN)—*continued.*

Loire. BARRON, 1888. Above Briare. BAUDE, 1829; LECHALAS, 1860; LOIRE, 1869.

—— Loire, central. Prevision of rises in the. MAZOYER, 1890.

—— Effect of the backwater of Pinay on the rise at Roanne. GRAEFF, 1873.

Lozoya, Spain. VALLE (Lucio del), 1857.

Maas. THURY, 1820. Advantages of steam cable towing. HEYWOOD (J. M.), 1869.

—— Separation of the Waal and Upper Maas, and the return of the latter to its ancient bed. KRAYENHOFF, 1823.

—— Canalisation between Namur and the French frontier. HANS, 1880.

—— Report. GUILLEMIN (H.), 1840. Report, 1839. MEUSE, 1840. Model of weirs on the Meuse. HANS, 1876.

Maass (German). HAGEN (G.), 1861.

Main. Canalisation of the River between Frankfort and Mainz. MAIN, 1885, '88.

Memel. MEMEL, 1888.

Moselle. Canalisation. SCHRÖDTER, 1888.

Netherlands. BOLSTRA, 1754.

Neva. Lighter Navigation. HAMMOND (H. W.), 1879.

Oder. MEMEL, 1888.

Orne lower, Navigation of the. CACHIN, 1786.

Ourcq River and Canal, Works executed to regulate the waters of. VUIGNER (E.), 1862. Navigation. POLONCEAU (A. R.), 1839.

Po. BUODO, 1873; Po, River, 1872, '73. Hydraulic system. BOCCI, 1874; LOMBARDINI, 1840. Observations. LOMBARDINI, 1843, 1852.

—— At Turin. Dykes. PRINETTI, 1888.

Reno. Levelling. BRIGHENTI, 1857.

—— Drainage. Bologna and Ravenna. LANCIANI, 1893.

Rhine Basin, traction of boats. Report. MÜTZE, 1892.

Rhine. MEMEL; RHINE. Bed of the River, condition of. OCKHART, 1816.

—— Correction of the Rhine, in. BADEN, 1863.

—— Design for locking the Lower Rhine and Leck, and diversion of the water into the Ijsel. KRAYENHOFF, 1821.

—— International measurement of the current at Basle. GREBENAU, 1873.

—— Navigation. HOOF, 1828.

—— Navigation. Low Countries. ANONYMOUS, 1827, p. 43.

—— Navigation and trade. EICHHOFF, 1814.

—— Navigation between Strassburg and Lauterburg. WILLGERODT, 1888.

RIVERS (FOREIGN, EUROPEAN)—*continued.*

Rhine. Ports of Inland Navigation of the basin of the Rhine. IMROTH and Roessler, 1892.
—— Remarks on the importance of Free Navigation. RHINE (River), 1829.
—— Rhine and Moselle in Alsace-Lorraine. Water-gauge observations, 1807–72. ALSACE.
—— Rhine in Switzerland. Correction. FRAISSE, 1868.
—— Rhine (Upper) in Germany. Natural stream formation. HONSELL, 1887.
—— Tolls and Trade. OCKHART, 1818.
—— Trade and Navigation. HERMAN, 1820.
Rhone. Correction, 1864–1877 (French and German). RHONE (River), 1877.
—— And the Lake of Geneva. VALLÉE (L. L.), 1843.
—— Canal proposed under the citadel of Besançon. BERTRAND (P.), 1803.
—— History of the River. LENTHÉRIC, 1892.
—— Rhone. Improvement of the mouth of the river. GUÉRARD (A.), 1885, '92.
—— Junction of the Rhone to the Rhine. BERTRAND (P.), 1804.
—— Marseilles. SIBOUR, 1876.
—— Studies on the inundations in its basin. RHONE (River), 1862.
—— Works at the mouth. Canal St. Louis. RHONE (River), 1860.
Sambre and Oise Rivers. Concession of the Canal joining them. SAMBRE, 1830.
Saône from Gray to Chalons. Project for its improved navigation. SAÔNE, 1835.
—— Saône and Moselle, Canal joining them. SAÔNE, 1828.
Scheldt. MEY, 1892.
—— Improvement of the Mouth. TROOST and Vandervin, 1892.
—— Influence of the weirs of the Eastern Scheldt on the navigation of the Western Scheldt. CONRAD (F. W.), 1867 ; SCHELDT (River), 1866.
—— Proposed barring of the East and Sloe channels. HAGEN (G.), 1867 ; HARTLEY (Sir C. A.), 1867.
—— Scheldt and Lys Rivers. Their Canalization. SCHELDT (River), 1837.
Seine Canalization. SEINE (River), 1827, p. 182.
—— Canalisation between Paris and Rouen. BOULÉ, 1889.
—— Deposition on the damming up and the movements of the bottom of the estuaries of. VAUTHIER (L. L.), 1885, p. 368.

RIVERS (FOREIGN, EUROPEAN)—*continued.*

Seine. Estuary and the ports of Havre and Rouen.
VAUTHIER (L. L.), 1879, p. 368.

—— Hydrographic Manual of the basin of the Seine.
PRÉAUDEAU, 1884.

—— Hydrological Observations in the basin of, 1873, etc.
FRANCE, p. 436.

—— Improvement of the estuary. COENE, 1886, 1890.

—— Improvement of the navigation between Paris and Rouen.
KRANTZ, 1871 ; MONIER, 1832.

—— Improvements. Purification, etc. DURAND-CLAYE, 1872, '85 ; SEINE (River), 1845, '74,'76–'77, '92 ; LAVOINNE, 1885 ; VARENNE (F. M. de), 1886.

—— Lighting of the estuary. BELLEVILLE, 1893.

—— Lower Seine. Improvement.
VAUTHIER (L. L.), 1879, '82, '86, '88, pp. 367–8.

—— Maritime Canal. SEINE, 1827.

—— Mouth. PARTIOT, 1886.

—— Navigation. Report, 1881. LAGRENÉ.

—— Regimen. SEINE (River), 1885, p. 181.

—— Regimen of currents and tides.
QUINETTE de Rochemont, 1874.

—— Roadstead in War. COENE, 1892.

—— Reports of Inspectors of the Ponts et Chaussées.
SEINE, 1828.

—— Sources of the basin of the Seine. BELGRAND, 1854.

—— Survey of the Estuary in 1875.
ESTIGNARD, 1877 ; QUINETTE de Rochemont.

—— Tariffs, &c. SEINE, 1826–27.

—— Tidal Seine. MENGIN-LECREULX, 1892.

—— Traction on. CAMÉRÉ, 1892.

—— Water in the basin of the Seine in the quaternary age.
BELGRAND, 1867.

Seine, Marne and Yonne. Applicability of the Weirs to the Shannon. FORSYTH, 1873.

Spain (Ebro, Douro, Guadiana, Guadalquivir and Tagus).
EBRO, 1881.

Spree. Embankments near Charlottenburg. MOHR (E.), 1886.

Spree, Havel, Moselle, &c. Regulation. SPREE, 1880.

Tagus (Portuguese). MENDES GUERREIRO, 1892.

—— Aranjuez to the Atlantic. CABANES, 1829.

Theiss. Regulation. PASETTI, 1862 ; RIEDEL, 1880.

Tiber. BONINI, 1663 ; TIBER, 1879–82.

Tiber. Cost of restoring to Rome the lost Navigation.
MEYER (C.), 1685.

RIVERS (Foreign, European)—*continued.*

Tiber And its tributaries. Smith (Strother A.), 1877.
—— Canalization in the meadows of Castello. Cesarini, 1880.
—— Deviation of. Vescovali, 1880.
—— From the Acqua Acetosa to the Sea. Systematizing. Possenti, 1871.
—— Hydrometric Studies. Vescovali, 1875.
—— Means of rendering its overflow innocuous to the city of Rome. Rome, 1872; Tiber, 1871.
—— Navigation. Casoni, 1846.
—— Navigation. Steam barges. Cialdi, 1845.
—— Project of a new canal. Cadolini, 1881.
—— System. Cesarini, 1878.
—— Systematizing and preservation of the old bridges. Vescovali, 1874, '75, '80, '81.
Ticino. Ajraghi, 1872; Bocci, 1874.
Tisza and its affluents. Hungary, 1879.
—— Inundations. Türr, 1886.
Vanne (River), Derivation of the sources of the valley of. Vanne River, 1871.
Vara. Raddi, 1889.
Vistula. Memel, 1888.
—— Oder, Elbe, Weser and Rhine, regulation of. Weichsel, 1879.
Volga, mouths of the. Timonoff (V. E.), 1892.
Weser. Memel, 1888.
Weser, Elbe, Rhine, &c. Hydrological researches. Wagner (J. von), 1881.
—— Map from Bremen to Bremerhaven. Weser, 1891. Add. 538.
—— (Unter). Project for correction. Gercke, Nieuburg and Franzius, 1882. Correction. Franzius, 1888.
Wien. Project of arching over the river at Vienna. Klunzinger, 1882.
—— Regulation of the river at Vienna. Berger and others, 1883.

RIVERS (in India). Applegarth, 1881.
Equalizing Pressure on Foundations of Locks, 1881. India, p. 106.
Navigation by Steam Vessels. Bourne (J.), 1849; Hoseason, 1858; India, p. 107; Johnston (J. H.), 1831.
Bengal (Rivers of), 1858. India, p. 110.
Cuttack Rivers. Papers, 1858, '60. India, p. 117.
Damoodah Embankments, 1853, '54, '63. India, p. 117.

RIVERS (IN INDIA)—*continued.*

Ganges. Direct Water Communication between the Ganges and Calcutta, 1854. INDIA, p. 114.
—— Illustrations, 1825. INDIA, p. 119.
—— Improvement in the navigation by iron steam vessels. ROBINSON (Albert), 1848.
Godavari. Godavari and Krishna Deltas, 1859. INDIA, p. 118.
—— Navigation, 1856, '57, '67. INDIA, pp. 118–9.
—— Opening up of the river, 1868. INDIA, p. 119.
—— Papers, 1862, '67. INDIA, p. 119.
—— Report on Upper Godavari Works, 1866. INDIA, p. 119.
Gogra. Survey of the River, 1854. INDIA, p. 119.
Hooghly. Illustrations, 1825. INDIA, p. 119. Navigation. BROOKS (W. A.), 1840.
—— Reports, etc., 1854, '64, '65, '86. INDIA, p. 119.
—— Silting up of the river, 1875. INDIA, p. 119.
—— Shoals and Sandbanks. PIDDINGTON, 1854.
Indus, 1855. INDIA, p. 131.
—— Bridge over the Indus at Sukkur. ROBERTSON (F. E.), 1885.
—— N. W. Railway Bridge over the Indus. ROBERTSON (F. E.), 1885.
—— Floods. O'CONNELL, 1871; INDIA, 1875, p. 120.
—— Geological Notes. VYSE (G. W.), 1880.
—— Route of the Indus, 1865. INDIA, p. 120.
—— Navigation, 1858. INDIA, p. 120.
—— Indus Valley State Railway. Ferry over the River Indus at Sukkur. ROBERTSON (F. E.), 1884.
Irawadi. GORDON (R.), 1885. Hydrography. GORDON (R.), 1879–80.
—— Memorandum, 1858. INDIA, p. 120.
—— Works in the Irrawaddy Circle, 1883. INDIA, p. 120.
Krishna. Photographs of the works on the Bridge over the river at Bezwada. INDIA, p. 121.
Mahanuddy. Improvement of navigation and irrigation, 1864. INDIA, p. 125.
—— Disposal of excessive flood waters, 1860. INDIA, p. 125.
—— Report upon the floods during 1872. RHIND (R. H.), 1875.
Mutlah. Formation of Port Canning, 1865. INDIA, p. 129.
—— Opening of a communication with the sea from Calcutta, 1854. INDIA, p. 126.
Narra. Eastern Narra, 1857, '61. INDIA, p. 127.
Nerbudda or Narmadá River. Navigation. SOWERBY (W.), 1871.
—— Physical character, 1855. INDIA, p. 127.

RIVERS (IN INDIA)—*continued.*

Nuddea Rivers, 1854. INDIA, p. 127.

Punjab. Navigation with description of Steam Boats recommended, 1860. INDIA, p. 129.

—— Land of the Five Rivers and Sind. Ross (D.), 1883.

Ravee. Tree Spurs to stop encroachments of the River. LALL (K.), 1867.

Salween River. Tour east from Tounghoo, 1856. INDIA, p. 114.

—— Expedition, 1864–65. INDIA, p. 130.

Taptee. Irrigation from the River, 1861. INDIA, p. 132.

Yerla. Irrigation in the Yerla Valley, 1864. INDIA, p. 133.

RIVERS (WEST INDIES). Demerara Bar and Report of Georgetown. DEMERARA, 1880.

RIVETS. Different systems of riveting. MONBRO, 1877.

Improved machines for punching and riveting large or heavy Platework. ARROL, 1878.

Riveting. CLAUZEL, 1882.

ROADS. PARDO, 1892; STEVENSON (R.), 1824; THOMASON Civil Engineering Coll., 1862–4.

Amendment of the roads. Proposals for the effectual. ANONYMOUS, 1753, p. 53.

Asphalt. MALO, 1886; DELANO, 1893. Rock Asphalt and Concrete. GUTHRIE (E.), 1874. Compressed asphalt. MALO, 1864.

Ballasting and Sweeping. DUMAS, 1842.

Bridges, Indexes to Reports of Commissions on Roads and, 1803–30, 1800–46. PARLIAMENTARY..Papers, p. 512.

Broad Wheels. Reports of the Committee on Acts regarding their use, 1808–9. PARLIAMENTARY..Papers, p. 511.

—— Utility of broad wheels. PATERSON (J.), 1819.

Compared with Railways. ANONYMOUS, 1825, p. 54.

Construction of. ADAMS (W. B.), 1837; ANONYMOUS, 1774. App. 544; COLOMBO and Solerti, 1894. Add. 493; EDGEWORTH, 1813, 1817; GAUTIER, 1721. Roads and Streets. LAW and Clark, 1877.

—— Construction and maintenance. BURROWS, 1885; ELLICE-CLARK, 1876; LOVE (E. G.), 1890.

—— Constructing and repairing common Roads. BURGOYNE (Sir J. F.), 1861.

—— New patent system of constructing new and of repairing the old Carriage Ways. CHAMBERS (A. H.), 1842.

—— Construction and repair of Roads. GLEN (A.), 1879.

Cost, vehicles and communications. STEENSTRUP.

Curved portions of roads, modes of setting out the. LALL (K.), 1854.

ROADS—*continued.*

Depth, length and inclination. RADDI, 1891.

Effects on Population. ANONYMOUS, 1831, p. 44.

Farm roads, fences and gates. SCOTT (J.), 1883.

Form of roads. GILBERT (D.), 1825.

Gradation of roads. LAUNHARDT, 1880.

Great Cities. BOSC, 1873.

Highway Acts, 1881. Report of Select Committee. PARLIAMENTARY..Papers, p. 512.

—— Reports from the Select Committee on Highways, 1808–20. PARLIAMENTARY..Papers, p. 511.

—— History, construction, cost, etc. WHEELER (W. H.), 1877.

—— Highways of the People. FISHER (S. B.), 1883.

—— Index to House of Commons Reports on Highways, Wheels, and Carriages, 1806–33. PARLIAMENTARY..Papers, p. 512.

Improvement of Public Roads urged during the existing dearth of employment for the poor. WICKENS (W.), 1821.

Indicator (Road) or Instrument for ascertaining the comparative merit of roads. MACNEILL, 1833.

Legislation (Road). BALFOUR (D.), 1876.

McAdam. Circular Letter on McAdam and Roads. PATERSON (J.), 1825.

—— Report from Select Committee on M'Adam's Petition on Roads, 1823. M'ADAM.

—— Macadamised Roads. CODRINGTON, 1892. Maintenance. CODRINGTON, 1879; ANONYMOUS, 1843, p. 54.

—— Superiority for the Streets of Large Towns. SMITH (John P.), 1849.

—— Macadamized Streets and Roads, 1868. PARIS, p. 456.

Maintenance. CODRINGTON, 1889. Cost. GREENWELL (A.), 1893.

Making (Road). ANONYMOUS, 1856, p. 49; BARKHAUSEN, Nessenius and Houselle, 1892; GILLESPIE (W. M.), 1853, '74; GREENE (F. V.), 1889; KRÜGER, 1881; LEAHY, 1847.

—— Handbook of Engineering Science. HEUSINGER von Waldegg, 1877, '83. Add. 507.

—— Rules for estimating repairs to tanks and channels. ANONYMOUS, 1852. Add. 481.

—— Specification of Works. BLENKARN, 1865.

Mechanical Power on Turnpike roads. ANONYMOUS, 1842, p. 51.

Metal. BRICKA, 1886; CANTAGREL, 1886.

Modes of travelling. ANONYMOUS, 1839, p. 54.

Mountain Roads, Treatise. WILKINS (H. St. C.), 1879.

Papers Relating to Roads. PAGE (Col. F.), 1843. Add. 525

ROADS—*continued.*

Present system of Road making, 1816, '20, '22. M'Adam.
Principles upon which they should be made.
Parnell (Sir H. B.), 1833, 1838.
Propulsion by other than animal power. Gore (H.), 1873
Receipts and Expenditure on Account of the Highways, 1868–77. Abstracts. Parliamentary..Papers, p. 512.
Repair of Main Roads. Wheeler (W. H.), 1879.
Repair of Roads. Anonymous, 1840, p. 58.
—— Report from Committee on the repairing of any particular Highway, 1765. Parliamentary..Papers, p. 511.
—— Present state of the Rural Road Question.
Ellice-Clark, 1886.
—— Plan for a smooth and durable road. Stevenson (R.), 1820.
Steam Traction. *See* Steam Traction on Roads.
Streets and Pavements. Gillmore (Q. A.), 1876.
—— Small square stones for street paving. Smith (John P.), 1850.
Surveys. Anonymous, 1800, p. 54.
Tables for setting out Half-widths. Olver, 1870.
Turnpike Continuance Acts, 1863–1878. Glen (A.).
—— Acts for Public Highways and Turnpike Roads, 1800.
Parliamentary..Papers, p. 511.
—— Fitness of Turnpike roads and Highways for internal Communication. Gordon (A.), 1835.
—— Formation, state and condition. Chambers (A. H.), 1820.
—— Memorial on the subject of Turnpike Roads. M'Adam, 1820.
—— Observations on Turnpike Roads and Toll Bars.
Deacon (W.), 1807. App. 553.
—— Public and private economy. Gordon (A.), 1837.
—— Report of Lords' Committee on Turnpike Returns, 1833.
Parliamentary..Papers, p. 512.
—— Reports from Select Committees on Turnpike Trusts, 1836, 1839. Parliamentary..Papers, p. 512.
—— Reports on Turnpike Roads (1796–98).
Parliamentary..Papers, p. 511.
Underground Roads. Stoppings on. Wain (E. B.), 1893.
Village roads. Durand-Claye and Marx, 1885.
Watering, Road. Crimp, 1886.

Agra to Bombay. Route Book, 1843. India, p. 107.
Alford District. Stone Breaker and Automatic Delivery Appliance. Hogg (A.), 1887.
Baden. Roadmaking administration in. Bär, 1873.
Bathgate and Airdrie road, 1833. Report respecting proposals by Steam Carriage Company of Scotland, to the Trustees.
Jardine (J.). Add. 512.

ROADS—*continued.*

Belgium. Routes. Employment of a credit of six millions.
BELGIUM, 1838, p. 117.

—— Maps indicating their development, 1830–80.
BELGIUM, p. 117.

Berlin. Asphalt. MALO, 1885.

Bombay. Road to Mahabuleshwur *viâ* Ambur Khind and Mundur Dew, 1862. INDIA, p. 113.

Boston Union and Rural Sanitary Authorities. Report on the Highways of the parishes comprising.
WHEELER (W. H.), 1879.

Calcutta and Dacca, communication between. 1856.
INDIA, p. 107.

Canterbury, N.Z. Practicability of constructing a bridle road through the gorge of the Otira. DOBSON, 1865.

Cape Colony. Report of the Chief Commissioner for 1863.
CAPE Colony, p. 222.

—— Reports of the Chief Inspector of Roads, Bridges, and Buildings. CAPE Colony, p. 222.

Carlisle and Port Patrick, Roads between. CARLISLE, 1811.

Carmarthen, Brecknock, Monmouth and Gloucester. 200 miles of Turnpike road. HOPKIN, 1805.

Cleveland Mines. Main roads maintained by Steel supports.
STEAVENSON (A. L.), 1888.

Coleshill, through Lichfield and Stone, Staffs. Second district of the Turnpike Road from. HAMILTON (G. E.), 1825.

Commercial Road, London. Acts. COMMERCIAL, 1802–55.

Dacca to Arracan. Report, 1856. INDIA, p. 107.

Edinburgh and Morpeth Road. Report and estimate.
EDINBURGH, 1822.

Ely (Isle of). Highways and Locomotives (Amendment) Act, 1878. Report on Main Roads. WHEELER (W. H.), 1884.

England. Our Roadways. ANONYMOUS, 1876, p. 51; BRITTON, 1833; OGILBY, 1712; PHILLIPS (R.), 1737.

—— Bill for ascertaining the duties of Occupiers of Land adjoining to Highways and Turnpike Roads in England, 1810. PARLIAMENTARY..Papers, p. 511.

—— Bill to amend the Laws relating to Turnpike Roads and Highways in England, 1810.
PARLIAMENTARY..Papers, p. 511.

—— Improvement of the public roads of the Kingdom.
HOMER (H.), 1767.

—— Paterson's Roads. England, Wales, and part of Scotland.
PATERSON (D.), 1829.

—— Report of Commissioners for enquiring into the state of the Roads in England and Wales, 1840.
PARLIAMENTARY..Papers, p. 512.

ROADS—*continued.*

England. Report from Committee on the Highway and Turnpike Roads in England and Wales, 1811. Report from Select Committee, 1820.
PARLIAMENTARY..Papers, p. 511.

—— Connection of Turnpike Roads with the Post Office.
FUGE, 1832.

Essex. Act for improving roads. ESSEX, 1785.

Europe. Reports upon the construction and maintenance of Public Roads in European States, 1882.
PARLIAMENTARY..Papers, p. 512.

France. FRANCE, 1873, '80 ; LUCAS (F.), 1873.

—— Construction of roads and carriages. Notice of MacAdam's system and considerations on the public ways of France.
EDGEWORTH (R. L.), 1827. App. 555.

—— Repair of parochial roads. BERTHAULT-DUCREUX, 1845.

—— Road Making. SOCIÉTÉ des Ingénieurs Civils, 1871.

—— Roads and Bridges. REYNAULD (L.), 1883.

Fulham. Report on main Roads. NORRINGTON, 1889.

Galway and Mayo. GALWAY, 1889.

Glasgow and Carlisle Road.
SCOTLAND, Roads and Bridges, 1815, p. 175.

Glasgow to Ayrshire, survey. GRAINGER and Miller, 1829.

Glasgow to Elvanfoot. Practicability of a road from, by Blantyre, Stonehouse and Douglas-Mill. INGLIS (J.), 1814.

Glasgow and Port Patrick. GLASGOW, 1823–24.

Gloucestershire. Act for improvements of roads, 1785.
GLOUCESTER.

—— Reports of Highways and General Purposes Committee.
GLOUCESTER, 1893.

Great Britain and the Colonies. Road progress. Amalgamation of railways and Highways for agricultural improvements.
ADAMS (W. B.), 1850.

Hamilton to Elvanfoot. New line of road from.
ABERCROMBIE, 1813 ; MACQUISTON, 1813.

Hampton. Act for the improvement of the Road from, to Staines, 1773. HAMPTON.

Hindostan and Thibet Road, 1856. INDIA, p. 107.

Holland (North), Lincolnshire. Main Roads. Reports.
WHEELER (W. H.), 1879–83.

Holyhead Road. Report on the Road from Ketley Ironworks to Chirk in N. Wales. TELFORD (T.), 1830, p. 288.

—— Report to the Commissioners on its state, and for improving, and other Reports on it. TELFORD (T.), 1820–28, p. 287.

—— Reports from Committees of the Houses of Parliament, 1810–30. HOLYHEAD Road.

—— Report of Commissioners, 1816, 1824–50. HOLYHEAD Road.

ROADS—*continued.*

Holyhead Road. Reports from Select Committee, 1820. HOLYHEAD Road.

—— Rules for repairing roads, 1827. HOLYHEAD Road.

—— Money granted and expended for improvement of the road, 1830. HOLYHEAD Road.

India. Amalgamated District Roads Fund, 1861–62. INDIA, p. 111.

—— Number of miles of roads. INDIA, 1859, p. 107.

—— Road and Tank Department, 1842–46. Report. INDIA, p. 107.

—— Traffic. LOGIN, 1866, '67, '69.

Ipswich. Information as to Steam Road Rolling. BUCKHAM, 1879.

Ireland. Bills for amending Irish Road Acts, 1809, 1810. IRELAND, p. 143.

—— Report of Commission, 1887. IRELAND, p. 141.

Italy. ITALY, pp. 146, 148.

—— Laws relating to bridges and common roads, 1860–83. ITALY, p. 146.

Jersey. Construction of the new northern road. SAINT HELIER, 1844, 1847, 1853.

Kent. Act for improvement, 1768, '89. KENT.

Kyle-Rhea in Invernesshire to Killin in Perthshire, *viâ* Rannock Moor. Proposed Road. Report and Estimates. TELFORD (T.), 1810, p. 287.

Lanark and Dumbarton. Act for making and maintaining Roads, 1820. LANARK.

Lancashire. Act for improvement, 1784–95. LANCASTER.

Lincolnshire, Lindsey. Report on Main Roads, 1887, '89, and suggestions to Surveyors of Highways on the management of Main Roads, etc. THROPP (J.), 1886, '87.

London and Liverpool. Mail Road made by Telford. Reports of a survey on. TELFORD (T.), 1826, p. 288; 1829, p. 288.

London. Circular for Commissioners of the Metropolis Roads. PATERSON (J.), 1826.

—— Road maintenance and horse-draught through Steam Road Rollers. PAGET (F. A.), 1870.

—— Survey of the principal metropolitan roads. BURGOYNE (Sir J. F.), 1861.

Lorraine. High roads of the Duchy. FRASER (S.), 1729.

Madras. Report of the Road Department, 1854–55. INDIA, p. 125.

—— Reports on District Roads, 1853–56. INDIA, p. 125.

ROADS—*continued.*

Melbourne. Specification for stripping, cutting down, forming, ballasting and tar-metalling. MELBOURNE.

Middlesex. Act for improving the Roads, 1789. MIDDLESEX.

Montreal. Report of City Surveyor. ANSLEY, 1877.

New South Wales and India. DENISON, 1864.

New Zealand. Construction of Roads, 1872–73. NEW ZEALAND, p. 412. In North Island, 1871. NEW ZEALAND, p. 412.

Norfolk. Reports of County Road surveyor. BRERETON, 1879.

—— Report on the Highway Management and Audit systems. BRERETON, 1884.

Oxfordshire. Act for improving the roads, 1784. OXFORD.

Paris. ARNTZ, 1866.

Paris to Dieppe and to Havre. PARIS, 1736, p. 452.

Peermade Ghaut road, India. Works of. JOHNSTON (T. M. H.), 1868.

Plymouth and Devonport. Proposed Turnpike Road from, to St. Austell. RENDEL (J. M.), 1835,

Porto Cabello. Proposed macadamized road from, to Valencia. PORTO CABELLO, 1838.

Prairie roads and Streets. NICHOLL, 1878–79.

Punjab Road. Report for 1853–54. INDIA, p. 130.

Queensland. Northern Division. Report. QUEENSLAND, 1871, p. 73.

—— Reports. QUEENSLAND, 1874, 1875–76, p. 73.

Regent's Park. Steam Carriage running in. GURNEY, 1827.

Rochdale. Act for the improvement of the road between, and Edenfield, 1794. ROCHDALE.

Sandon. Turnpike Road from, to Hugbridge, Staffs. Report. HAMILTON (G. E.), 1827.

Scinde. Roads and Stages from Guzerat Cutch, Jeysulmeer and Joudpoor, etc., 1846. INDIA, p. 131.

Scotland. The Highlands. A Bill for maintaining certain roads, etc., in them. SCOTLAND, 1810, p. 175.

Shrewsbury and Bangor Ferry Road. Report. SHREWSBURY, 1820, 1821.

Spalding. High Bridge to the Market Place in Donnington. Act, 1764. SPALDING.

Staffordshire. Act, 1769–1807. STAFFORD (Co. of).

Surrey. Roads Improvement Act, 1780. SURREY.

Sussex. Roads Improvement Act, 1770. SUSSEX.

Switzerland. BAVIER, 1878.

Tavistock Road Act, 1772. TAVISTOCK.

Tounghoop Pass. Mountain Road, India, 1854–56. INDIA, p. 132.

Tours to Bordeaux. Cost of construction. ANONYMOUS, 1855, p. 57.

ROADS—*continued.*

United States. Lines of communication in the United States. CHEVALIER, 1840–41.

—— Construction and Maintenance of Roads. NORTH (E. P.), 1879.

—— Consular Report on Streets and Highways in foreign countries. UNITED States, 1891, p. 356.

—— Country Roads. HAUPT (L. M.), 1891.

Victoria. Road Returns. VICTORIA, 1851–61, p. 378.

Watling Street, Roman Roads in Durham and Northumberland, 1850–51. MACLAUCHLAN.

Westminster. Paved and Macadamised Roadways. ARNTZ, 1857.

Whetstone Turnpike Trusts, Report on the Road from Whetstone to St. Albans. WHETSTONE, Middlesex, 1828.

ROCKS. Removal of Rocks, Subaqueous and Dry land, by a new Method. LOBNITZ and Co., 1888.

ROCK-CUTTING APPARATUS. Lobnitz Solid Rock-Dredger "Majestic." LOBNITZ and Co., 1894. Add. 516.

ROCK DRILLS. DRINKER (H. S.), 1878, 1883; DRINKER (H. S.), 1893. Add. 497.

Bromfield-Ingersoll hand-power Rock drill, Rock Drill Company. BROKEN Hill, 1890.

Competition, Rock drill, 1890. Certificate. LONDON, p. 259.

Diamond Drill. ANONYMOUS, 1871, p. 44. Victoria Diamond Drills. Report. VICTORIA, 1885, p. 377.

Machinery, Rock-boring. DARLINGTON (J.), 1879.

—— Machine power in Rock drilling; its application. SCHRAM (R.), 1878.

Mackean Rock Drill. MACKEAN, 1885.

Percussive Rock-drilling. BOLTON (R.), 1890.

ROCKETS. BARBER (F. M.), 1874.

Application of rockets to the ropes thrown for life-saving in shipwreck. KONSTANTINOFF, 1863.

Principles of Congreve Rocket system. CONGREVE, 1827.

Properties of. MAURICE DE SELLON (P. E.), 1848. Add. 519. Trial of their properties by Col. A. Pictet. SELLON (P. E. M. de), 1848.

War Rocket. KONSTANTINOFF, 1861. Construction. PARLBY, 1862.

ROLLER MECHANISM, Sphere and, for transmitting Power. HELE-SHAW and Shaw, 1885.

ROLLING MILLS. GILLON and Dujardin, 1873.
Method of preventing Shock in reversing. HEAD (J.), 1873.

ROOFS. FAIRBAIRN (Sir W.), 1866, p. 403 ; PHIPPS, 1881. Specimens of. TREDGOLD (T.), 1840, 1870, 1875.
Bridge and roof construction, combined. LANGER (J.), 1873.
Construction of Roofs, Treatise on the, as regards carpentry and joinery. ANONYMOUS (1868), p. 58.
—— Theory of Construction of Roofs. WOOD (De V.), 1876.
Curved Roofs, Method of obtaining by diagrams the Strains in. TIMMINS (T.), 1882.
Girder, Mechanics of the. CREHORE, 1886.
Iron Roofs. MAYNARD, 1868.
—— Calculations and theory of Iron Roofs. RITTER (A.), 1879.
—— Construction. CAMPIN, 1850.
—— Examples. DEMPSEY, 1850 ; TIMMINS (T.), 1882.
—— Examples of Design. Description, illustrated with working drawings. WALMISLEY (A. T.), 1884, '88.
—— Roof Structures. MATHESON, 1873, '77.
Lectures on Roofs. UNWIN (W. C.), 1868.
Scantlings of beams for flat roofs. THOMASON Civil Engineering Coll., 1853–54.
Strength of Roofs. SHREVE (S. H.), 1877.
Theory of Strains for the calculation and construction of Roofs. DIEDRICHS, 1871.
Trusses, Graphical analysis of Roof. GREENE (C. E.), 1876.
Wind Pressure on Roofs, Memorandum on the effect of. UNWIN (W. C.), 1874, p. 359.
Wood and Iron Roofs, Construction of. TARN (E. W.), 1882.
Wrought-Iron Roofing, as applicable to every description of building, India. GOODWYN, 1844.
Wrought-Iron Roofs, with examples of the calculation of stress in roof-trusses by graphic and algebraic methods. UNWIN (W. C.), 1869, p. 360.
Birmingham, Iron Roof of Railway-Station, New Street. PHILLIPS (Joseph), 1855.
Horsley (East) Park, Construction of a Collar Roof at. LOVELACE, 1849.
Huddersfield Station, Report upon the Fall of Roof at. WAUGH (J.), 1885.
Liverpool, Lime Street Railway Station, Description of the Iron Roof over. TURNER (R.), 1850.
Maiden Lane. Iron Roofing to adjoin the buildings of the permanent goods and temporary passenger station, Maiden Lane. Conditions of Contract. CUBITT (L.), 1850.
Paper Roofs used at Tew Lodge, Oxon. LONDON, 1811.

ROPES.

Rope Maker's Guide. RUSSELL (B. R.), 1804.
Treatise on Rope-making. CHAPMAN (R.), 1868.
See also CORDAGE.

ROPEWAYS, WIRE.

Ropeways Syndicate. Improved Aerial Ropeways for economical transportation. ROPEWAYS Syndicate, 1893.
Telpherage. JENKIN, 1883 ; PERRY (J.), 1886, p. 30.
Truth as to the origin of Wire Rope. WILSON (James B.), 1889.
Various systems of Wire Rope Transport. CARRINGTON (T. H.), 1878.
Wire rope communication. RIETER and Ziegler, 1876
Wire Ropeways made at Bullivant's Factory, Description of. BULLIVANT (Messrs.), 1893. Add. 489.
Ceylon. Report on Wire Ropeways, 1870. INDIA, p. 117.

Territet-Montreux-Glion. STRUB, 1888.

ROTATION. Uniform Rotation. SIEMENS (Sir W.), 1866, p. 199.

RUDDER.

Balanced, for Screw Steamers. RANKINE (W. J. M.), 1866.
Holdsworth's Revolving Rudder. HOLDSWORTH (A. H.), 1832.
New form of balanced rudder. GUMPEL, 1870.
Steering gear and rudder strains, new system. MAGINNIS, 1886.

RUNES. Runic Monuments of Scandinavia and England. STEPHENS (George), 1866–68.

S.

SACCHARINE. Evaporation of Saccharine. FOSTER (J.), 1890.

SAFES.

Battle of the safes. Herring, New York *v.* Chatwood, Bolton. CHATWOOD, 1870.

Drill proof Safes. PRICE (G.), 1860.

Fire-proof Safes. BRAIDWOOD, 1850.

Iron Safes. HOBBS (A. C.), 1868.

SAFETY LAMPS. *See* COAL MINES, LIGHTING.

SAFETY VALVES. *See* STEAM ENGINES.

SAILING DIRECTIONS. Shannon and Loughs Derg, Roe, and Erne. Sailing directions. WOLFE (Com. J.), 1843, 1850.

SAILS AND SAILMAKING. KIPPING, 1865.

SAILORS. Our Seamen, how to get and how to keep them. McKIRDY, 1890.

SALT.

Preserved provisions. BEVAN (G. P.) Industries, vol. 12.

Report on its manufacture. ROWLAND (W. L.), 1883.

Reports on Salt Duties, 1801. PARLIAMENTARY., Papers, p. 512.

Salt Works. KARSTEN (C. J. B.), 1846.

Cheshire Salt District. WARD (T.), 1873. Cheshire Salt Districts Compensation Bill. WARD (T.), 1881.

England. Landslips in the Salt Districts, 1873, 1879. PARLIAMENTARY..Papers, p. 512.

Europe. Great European Salt Deposits, with a theory as to their origin. WARD (T.), 1874.

Huel Seton Mine, Salt spring in, Composition of the Waters. PHILLIPS (J. A.), 1873.

India. Manufacture of Salt in the Tumlook Agency, 1853. INDIA, p. 132.

Prussian States. Working of Salt Works, 1852–61, ALTHANS, 1863.

Rhineland, Rock Salt in. OEYNHAUSEN, Dechen and La Roche, 1825.

Scóvàr. Geological conditions of the rock salt mining district. GESELL, 1886.

Stassfurt Salt deposits. CADELL (H. M.), 1885. Add. 489 ; PRECHT, 1885.

SALTPETRE. Deposits of Peru. COLE (G. F.), 1875.

"SAMARANG" (H.M.S.), Voyage of. BELCHER, 1848.

SANATORIA. India. Maghassani Hills as a Sanatorium, 1861. INDIA, p. 110.

SAND. HÜBBE, 1861

Black sand from the River Don in Aberdeenshire. Chemical Analysis. THOMSON (T.), 1835.

Movement of water in sand. HÜBBE, 1861.

Pressure of sand and indications of movement in dry sand. FORCHHEIMER, 1883.

Special property of Sand. BEAUDEMOULIN, 1874.

Thrust of a mass of Sand against a vertical or inclined wall. BOUSSINESQ, 1884.

Use of Sand for Mortars in Sea Works. FERET, 1893.

SANITATION. NAVILLE, 1851.

Army, Sanitary Condition of the, particularly during Crimean War. ANONYMOUS, 1860, p. 54.

Desiccating and Rendering Apparatus, Firman's Patent sanitary. FIRMAN (H. S.), 1877. Add. 500.

Dirty Dust-bins and sloppy streets. BOULNOIS, 1881.

Domestic Sanitary Defects, Guide to. TEALE (T. P.), 1883.

Dry-Earth System. MOULE, 1875, '76.

Dwellings. House Sanitation. DENTON (E. F. B.), 1882; MACCALLUM, 1891; STANGER (G. H.), 1882. Architect's contribution to the healthfulness of houses and towns. TRÉLAT (E.), 1890.

—— Choice of a dwelling. WHEELER (G.), 1871.

—— Construction of Healthy Dwellings—Houses, Hospitals, Barracks, Asylums, etc. GALTON, 1886.

—— Death Trap in the House. HODGETTS (E. A. B.), 1889.

—— Drainage and Sewerage of Buildings. GERHARD, 1884.

—— Healthy and Unhealthy Houses in town and country. EASSIE (W.), 1872, 1884.

—— Healthy Houses. JENKIN, 1878; MURPHY, etc., 1883. Sanitary Arrangements for Dwellings. CORFIELD, 1879, '94; EASSIE (W.), 1874; JUDGE, 1884; WALLIS-TAYLER (A. J.), 1894.

—— House Sanitation. WOLPERT, 1887.

—— Sanitary House Inspection. GERHARD, 1885.

—— Sanitary requirements for house construction. CHADWICK (Sir E.), 1868, p. 235.

—— Sanitation applied to our homes. GILCHRIST (P. C.), etc., 1891.

SANITATION—*continued.*

Dwellings. Sanitation of the Dwellings of the Wage Classes. CHADWICK (Sir E.), 1877, p. 236.

—— Sanitary Improvements. SMITH (Southwood), 1854.

Industrial Sanitation. FREYCINET, 1870.

Journal of ... Sanitary Engineering. PERIODICAL PUBLICATIONS, p. 18.

Law. "Nuisances Removal and Diseases Prevention Act, 1849." LAWES (E.).

—— Return of all Districts under the Public Health Act, 1848, and Local Government Act, 1858. PARLIAMENTARY..Papers, p. 497.

—— Public Health Acts, 1848, 1858, Local Government Act, 1858. LUMLEY, 1859.

—— Public Health Act, 1875. LUMLEY (W. G. and E.).

—— Sanitary Act, 1866. MICHAEL (W. H.), 1867.

—— Reports of the Royal Sanitary Commission, 1870–74. PARLIAMENTARY..Papers, p. 498.

—— Model By-laws for the use of Sanitary Authorities. PARLIAMENTARY..Papers, p. 498.

—— Return of Urban Sanitary Authorities in England and Wales, 1880. PARLIAMENTARY..Papers, p. 498.

—— Laws relating to Public Health. BAKER (T.), 1865; GLEN, 1866.

—— Sanitary legislation and "local surveyors." ANGELL (L.), 1871.

—— Sanitary Legislation, 1887. ANONYMOUS, p. 55.

—— Sanitary Legislation, history. LANKESTER (E.), 1860.

Matters (Sanitary). Lecture. BROWN (S. S.), 1871.

Memoranda, Sanitary. DYMOND, 1874.

Militarianism, Sanitation *v.* CHADWICK (Sir E.), 1886, p. 236.

Mining Settlement, Sanitation of. MAULT, 1891.

Movement, Sanitary. WHITE (W.), 1850–1.

National gains by Sanitation. CHADWICK (Sir E.), 1887, p. 235.

Nuisances caused by Cess-pools and Water-drainage. MOULE, 1859.

—— Prevention of Excrement Nuisances in towns and villages. RADCLIFFE (J. N.), 1875.

—— Removal of Nuisances to Health and Safety, and for the Execution of drainage works. SMITH (Joshua Toulmin), 1861.

Organisation, Sanitary. CHADWICK (Sir E.), 1884, p. 234.

Principles of Sanitation. CHADWICK (Sir E.), 1889, p. 234.

Prisons. Report on the Construction of Public Latrines. SOCIÉTÉ Royale pour l'Amélioration des Prisons, 1825.

SANITATION—*continued.*

Progress, Sanitary. CHADWICK (Sir E.), 1881, 1882, p. 236.

Protection, Sanitary. PARRY (W. K.), 1884.

Public Health. PERIODICAL PUBLICATIONS, p. 22.

Question, Sanitary. (French). ANONYMOUS, 1886, p. 53.

Questions, Sanitary. Lectures, etc. RAWLINSON (Sir R.), 1854.

Record, Sanitary. PERIODICAL PUBLICATIONS, p. 24.

Reform, Sanitary, and Agricultural Improvement. ELLERMAN, 1848.

—— Sanitary Reform and Sanitary Reformers. ANONYMOUS, 1855, p. 55.

Review, Sanitary. PERIODICAL PUBLICATIONS, p. 24.

Review, Sanitary, of the Session, 1885. CHADWICK (Sir E.) p. 236.

Roads. Advantages and Economy of maintaining a high degree of Cleanliness in Roads and Streets, with account of street-sweeping machine. WHITWORTH (Sir J.), 1847.

Rural Districts, Sanitary Science in. HOOLEY, 1892; INGLIS (J. C.), 1880; MARSH (L.), 1876.

Rural Sanitary Authorities. APPLETON, H. D., 1887.

Sanitary Engineering. DENTON (J. B.), 1877; GALTON, 1877; LATHAM (B.), 1873, '77, 78; THOMSON (James), 1891.

Sanitary and Urban Engineering. MELISURGO, 1880.

Sanitary Science, Jubilee of. CHADWICK (Sir E.), 1887, p. 234.

Sanitary Science and Sewage question. ANGELL (L.), 1871.

Sanitary Works and Sewage Utilisation. DENTON (J. B.), 1869.

Science, Sanitary, and Practice. CARTER (H.), 1881; CHADWICK (Sir E.), 1889, p. 235.

Siftings, Sanitary. ANONYMOUS, 1868, p. 55.

Siphons, Self-acting intermittent, and the conditions which determine the commencement of their action. FIELD (R.), 1879.

Soil pipe ventilation. BRENAN, 1880.

Tables for ascertaining the discharges at different depths in the same Sewers, and the heights of Weirs or Storm Overflows. GLOYNE, 1890.

Towns. Sanitation of. FREYCINET, 1870.

—— Arterial and Venous system. WARD (F. O.), 1889.

—— Sanitary condition of Communities, and the comparative salubrity of towns. LETHEBY, 1874.

—— Health of Town Association. Why are towns unhealthy? HEALTH, 1883.

—— Hygiene of towns. BARDE, 1891.

—— Purification of Towns. BLASIUS, 1894. Add. 485.

SANITATION—*continued.*

Towns. Sanitary Improvement of Towns. Description of Goux's patent absorbent closet system. TARGET (F. N.), 1871.

—— Sanitary work in the smaller towns and villages. SLAGG (C.), 1876.

—— Technical Principles of sanitation for towns and houses. WAZON (A.), 1884.

—— Collection, treatment and disposal of Town Refuse. LOMAX, 1892.

—— Collection and Disposal of City Refuse. HILL (L. M.), 1883.

—— Disposal of the Refuse of Towns. FRYER, 1887.

—— Town Refuse, the remedy for Local Taxation. MONK, 1872.

—— Utilisation of Town Refuse. NICOLL, 1884.

—— Disposal of Slop Water of Villages. FOX (C. B.), 1875.

See also DESTRUCTORS; REFUSE OF TOWNS.

Value (Financial) of Sanitary Science. CHADWICK (Sir E.), 1887, p. 234.

Waring, System. PONTZEN, 1884.

Women's position as Sanitarians. CHADWICK (Sir E.), 1887, p. 236.

Abingdon, Amsterdam, Berlin, Croydon, Leamington, Manchester, Rochdale. MITGAU, 1880.

America. Sanitary Engineering. PHILBRICK, 1881.

Australasia. Sanitary Crusade through the East and Australasia. ANONYMOUS, 1892, p. 55.

Berlin. Sanitary works. MANNING (R.), 1876.

Bombay. LATHAM (B.), 1890.

—— Health Officer's Report, 1867. INDIA, p. 112.

Boston, U.S. City Scavengering. CLARKE (E. C.), 1879.

Brazil. City and Port of Santos. Sanitary Improvements. FUERTES (E. A.), 1894. Add. 501.

Brighton Improvement Bill, 1884. BRIGHTON.

—— Sanitary Condition. RICHARDSON (Sir B. W.), 1883.

—— Sewerage and Sanitary Condition of Brighton. BAZALGETTE (Sir J. W.), 1883.

Brunswick, Duchy of, sanitary condition, 1883–4. BLASIUS.

Calstock, etc. Sanitary Condition of Calstock, Devonport, Falmouth, Garston, Houghton-le-Spring, Malton, Smethwick, Southport, Ulverstone, Willenhall. RAWLINSON (Sir R.), p. 87.

Cambridge. Scavenger's Work. Report. STEPHENSON (G. W.), 1871.

SANITATION—*continued.*

Chicago problem, Lakes and Gulf Waterway.
COOLEY (L. E.), 1891.

Crimea. Report of Sanitary Commission despatched to the Seat of War in the East, 1855–56.
PARLIAMENTARY..Papers, p. 497.

Derby. Removal of the manure depôt by the treatment of refuse.
DERBY, 1878.

Devizes. Report to the Sanitary Committee.
BLACKWELL (T. E.), 1848.

Dublin Barracks. Sanitary Condition. DUBLIN, 1889.

English sanitary institutions. SIMON (Sir J.), 1890, p. 201.

—— Position of Sanitation in England.
CHADWICK (Sir E.), 1884, p. 235.

—— Sanitary State of the people in England. Report, 1858.
PARLIAMENTARY..Papers, p. 497.

—— Return from every Urban Sanitary District in England and Wales having more than 5,000 inhabitants, 1876.
PARLIAMENTARY..Papers, p. 513.

English and Scotch towns. MILLE, 1854.

European soldier in India. BADDELEY (P. F. H.), 1860.

German Towns. Cleansing of Streets and removal of House refuse in. WEYL (T.), 1891.

Gibraltar. Sanitary condition with reference to the epidemic cholera in 1865. GIBRALTAR.

Glasgow. Operations of the Sanitary Department.
MACLEOD, 1882.

Hackney District. Report on its Sanitary State for the years 1872, etc. TRIPE (J. W.), 1873–5.

Hong Kong, 1882. HONG KONG.

Hornsey. Catalogue of Sanitary Appliances in the Museum.
HORNSEY, 1892.

—— Scavenging, cleansing, dusting and road material contracts. HORNSEY, 1855.

India. LATHAM (B.), 1891.

—— Report, 1867–68. INDIA, p. 107.

—— Sanitary Works required for improving Indian stations, 1867. INDIA, p. 107.

—— Sanitary Engineering in India. WALLACE (John), 1893.

—— Sanitary works required for improving Indian stations.
INDIA, 1864. Add. 510.

Italy. PACCHIOTTI, 1891.

Leicester. Sanitary condition in 1853. MOORE (John).

Liverpool. Sanitary Requirements. STALLARD (J. H.), 1871.

London. Agar Town, St. Pancras. AGAR TOWN, 1851.

SANITATION—*continued.*

London. Belgrave, sub-district of St. George's, Hanover Square. Sanitation. ALDIS, 1856.

—— Brown's Street Watering System. HAYWOOD (W.), 1875, p. 34.

—— Sanitation and Reconstruction of London (Central). WOODWARD (W.), 1886.

—— Cleansing of Catchpits and Gullies. HAYWOOD (W.), 1888, p. 35.

—— Commissioners of Sewers. Report on work executed by, during 1893. Ross (D. J.). Add. 531.

—— Report on the Disposal of Refuse. HAYWOOD (W.), 1881, p. 33.

—— London and its environs. NETHERWAY, 1850.

—— Houses of Parliament. Sanitary Arrangements. HOUSES of Parliament, 1885.

—— Metropolitan Sanitary Administration. DUDFIELD, 1884.

—— Paddington, sanitary report for the year 1871–2. HARDWICKE, 1872.

—— Sanitary Condition for the year 1848–9. SIMON (Sir J.), 1849, p. 202, 1866–67, 1869–70. LETHEBY.

—— Sanitary Protection Association. Report, List of Members, 1886–87. LONDON Sanitary, etc.

—— Machines used for Scavenging purposes, Water Carts, etc. HAYWOOD (W.), 1879, p. 35.

—— Erection of Stand-posts in courts and alleys. HAYWOOD (W.), 1875, p. 35.

—— Experiments with Street Cleansing Machines. HAYWOOD (W.), 1890, p. 35.

—— Street Hydrants and Stand-posts. HAYWOOD (W.), 1875, p. 35.

—— London and the suburbs. CHADWICK (Sir E.), 1886, p. 236.

—— Tower Hamlets Court of Sewers. Report on the Sanitary condition of the Labouring population of Great Britain. TOWER HAMLETS, 1843.

—— Ventilators in Queen Victoria Street. HAYWOOD (W.), 1881, p. 35.

—— Washing with jet and hose the carriage ways of main streets. HAYWOOD (W.), 1873, p. 34.

Madras. Sanitary Commission. Reports, 1866, '67–'69. INDIA, p. 125.

Malta and Gozo. Sanitary Condition. MALTA, 1867.

Manchester. Street-sweeping machine, with report of the Road and Street Cleansing Company for 1841 and 1842. WHITWORTH (Sir J.).

Melbourne. Reports of Royal Commission on sanitary condition. MELBOURNE, 1889–90.

SANITATION—*continued.*

Mendoza, Argentina. NYSTRÖMER, 1888.

Newtown and Llanidloes Union, Sanitary Condition of the. WALKER (Lt. G. R.), 1893.

North Western Provinces. Report of Sanitary Commission, 1868. INDIA, p. 127.

Oxford. ORMEROD, 1848.

Oxfordshire. Sanitary Condition of. CHILD, 1874–77.

Paris. Chamber of Deputies. Sanitation. TRÉLAT (E.), 1891.

—— Sanitary Works on the Seine. MANNING (R.), 1876

—— Health of Paris. MILLE and Durand Claye, 1870; TRÉLAT (E.), 1888; VAUTHIER (L. L.), 1892.

Rio de Janeiro. Report on John Frick's proposition for Ventilation and purification of the city. RICHARDSON (Sir B. W.), 1889.

Rome. International Sanitary Conference. Rome, 1885. INTERNATIONAL San. Conf.

—— Correspondence. ROME, 1885.

Scotland. Sanitary Engineering in. ROBERTSON (G.), 1867.

Shoreditch. Health and Sanitary Condition of. BARNES (R.), 1857.

Singapore. Improvement of. MACRITCHIE, 1893.

Sliema, Sanitation for. Report, plans, etc. TRESIDDER (Capt. T. J.), 1884.

Southampton. Report on its vital statistics and sanitary condition for 1891. SOUTHAMPTON.

United States. History of Sanitary Commission. STILLÉ (C. J.), 1866; UNITED States, 1863, p. 355.

Valladolid. Sanitation. UHAGON (D. R. de), 1890.

Windsor Castle. Sanitary Works at. RAWLINSON (Sir R.), 1863.

Wrexham: its present sanitary condition. SHONE (I.), 1876.

SARCOPHAGUS. Origin and use. GERVILLE, 1833.

SAWS AND SAW MILLS. GRIMSHAW, 1880–82. Arrangement and Management. BALE, 1883.

SAWING MACHINE, for cutting Railway Bars. GLYNN, 1840.

Saw filing. HOLLY, 1868.

SCAFFOLDING (LONDON).

Regulations for Hoards and Scaffolds. HAYWOOD (W.), 1887, p. 35.

Scaffolding used in erecting the Nelson Column, Trafalgar Square. GRISSELL, 1844.

SCHOOL BUILDINGS. Town and Country. GARDNER (E. C.), 1888.

SCHOOL CONSTRUCTION. Sanitary principles of. CHADWICK (Sir E.), 1871, p. 236.

SCHOOLS (ENDOWED). Report of Select Committee, 1869, '73. PARLIAMENTARY..Papers, p. 476.

SCHOOLS AND COLLEGES. See UNIVERSITIES, Colleges, Schools, etc.

SCIENCE.

Abstract Science. Importance of studying. PLAYFAIR (L.), 1851.
American Journal of Science and Arts. PERIODICAL PUBLICATIONS, p. 9.
Ancient times, Science in. JULLIEN (B.), 1854.
Annals of Philosophy. PERIODICAL PUBLICATIONS, p. 11.
Année scientifique et industrielle. PERIODICAL PUBLICATIONS, p. 11.
Canadian Magazine of Science. PERIODICAL PUBLICATIONS, p. 13.
Claims of Science to public recognition. GUY, 1870.
Commerce, Science and. SIMMONDS (P. L.), 1872.
Decline, Alleged, of Science in England. ANONYMOUS, 1831, p. 50; BABBAGE (C.), 1830.
Ethical functions of Scientific Study. CHAMBERLIN, 1888.
Exact Sciences, Common Sense of the. CLIFFORD (W. K.), 1892.
Experimental Sciences in 1889. BADOUREAU.
Experimental Science as required for the Matriculation Examination of the University of London. AVELING (E.), 1888.
First Lines. MITCHELL (James), 1827.
Fragments of Science for Unscientific People. TYNDALL (J.), 1871, 1879.
Imagination in Science. Essay on its use and limit. TYNDALL (J.), 1870, p. 334.
India. Gleanings in Science. ANONYMOUS, 1829–31, p. 46.
Inductive Sciences. History. WHEWELL (W.), 1837, '57. Philosophy. WHEWELL (W.), 1847, '58. Indications of the Creator, WHEWELL (W.), 1846.
McGill University. Department of Practical Science. ARMSTRONG (G. F.), 1872.
Manchester Science Lectures, 1866–76. MANCHESTER Science.
Marvels of Science. FIGUIER, 1877.
Memoirs, Scientific, selected from Foreign Scientific and Learned Societies, and from Foreign Journals. TAYLOR (R.), 1837–62.
Mission of Science. THURSTON (R. H.), 1884, p. 310.
Murder of Science by the gold poison. ANONYMOUS, 1876, p. 58.
Natural Science. History. BUCKLEY (A. B.), 1876.
Observations in Science. LAKE (J. J.), 1843.
Organisation of Science. ANONYMOUS, 1892, p. 51.
Orr's Circle of the Sciences. ORR and Co., 1860.

SCIENCE—*continued.*

Papers, Scientific. MAXWELL (J. C.), 1890; SIEMENS (W. von), 1889–91 and 1892; WHEATSTONE (Sir C.), 1879.
Physical Forces, Correlation of. GROVE (W. R.), 1846.
Physical Sciences. BEUDANT, 1815.
—— Connection of the Physical Sciences. SOMERVILLE (Mrs. Mary), 1858.
—— Lectures. LLOYD (H.), 1834; TAIT (P. G.), 1876.
—— Progress. GROVE (W. R.), 1842.
—— Text Book. BOWMAN (F. H.), 1886.
Plates. ANONYMOUS, 1771–72, p. 54.
Popular Lectures. HELMHOLTZ, 1873.
Principles. JEVONS, 1874.
Questions, Scientific. Answers to. HERSCHEL (Sir J. F. W.), 1860.
Revue générale des sciences pures et appliquées. PERIODICAL PUBLICATIONS, p. 23.
Science. PERIODICAL PUBLICATIONS, p. 24.
Scientific Apparatus. Catalogue of Special Loan Collection. Conference, 1876–77. SOUTH KENSINGTON MUSEUM.
Scientific Gazette, or Library of Mechanical Philosophy. PERIODICAL PUBLICATIONS, 1825. Add. 528.
Scientific Roll and magazine of Systematized Notes. PERIODICAL PUBLICATIONS, p. 24.
Scientific Studies. LAUGEL, 1859.
Scientific Subjects. Lectures. HERSCHEL (Sir J. F. W.), 1867.
Scientific works. SIEMENS (Sir W.), 1889, p. 198.
Science and Art Department, Kensington. Expediency of carrying out the proposals of the Commissioners for the Exhibition of 1851. COLE (H.), 1853.
—— Science Lectures at S. Kensington. SCIENCE and Art Dept., 1878–9.
Western Review of Science. PERIODICAL PUBLICATIONS, p. 26.
Year book, 1891. BONNEY.

SCREW.

Archimedean Screw. New mode of construction. DAVAINE, 1846.
Bolt heads and Nuts. Standard sizes. SELLERS (C.), 1884.
Effective area of screws. JACOBUS, 1890.
Manipulation of the Screw. HOLDEN (E.), 1879.
Screw and gear cutting. FITZGERALD (W.), 1868.
Screw cutting tables for engineers and machinists. LINDSAY (Lord), 1878; MARTIN (W. A.), 1882.
Theory of Screws. BALL (Sir R. S.), 1876.
—— Cunningham Memoirs, vol. 4. ROYAL Irish Academy, 1880–88.
Threads, Screw. WHITWORTH (Sir J.), 1882.

SCREW PROPELLER. Bourgois, 1845; Paris (F. E.), 1855.
American, Modern. Edwards (E.), 1881.
Archimedian Screw Propeller. Anonymous, 1846, p. 56; Galloway (E.), 1842. Add. 502; Knowles (Sir F. C.), 1871.
Duplex (Patent) Screw-Propeller. Rigg (A.), 1866.
Geometrical and physical properties. Rawson (R.), 1851.
Introduction and progress. Smith (F. P.), 1856.
Inventor. Wilson (Robert), 1860.
Negative (apparent) slip in. Froude (W.), 1867.
Paddles. Comparative economy of screw ships and paddle vessels. Anonymous, 1856, p. 51.
—— Relative efficiency of the screw as compared with the paddle wheel. Bourne (J.), 1852, 1867.
Patent (improved) Screw Propeller. Griffiths (R.), 1862.
Patent Stern propeller for steam vessels. Maudslay (J.), 1843.
Practical remarks. Murray (R.), 1858.
Progressive Screw as a propeller in navigation. Révy (J. J.), 1860.
Propulsion of vessels by the Screw. Bodmer (J. G.), 1850; Burgh (N. P.), 1869; Fairbairn (Sir W.), &c., p. 404.
Resistance of Ships and Screw Propulsion. Taylor (D. W.), 1893.
Resistance and proportions of Screw Propellers. Bury (W.), 1883.
Resistance of Screw Propellers. Experiments to test the resistance of Screw-propellers when revolving in water. Rennie (G.), 1857, p. 100.
Rudder, balanced, for Screw Steamers. Rankine (W. J. M.), 1866.
Screw propeller *v.* rudder. Baldrey, 1879.
Shafts. Reports relative to the screw shafts of the S.S. Atrato. Atrato (S.S.), 1873–74.
—— Shafting of Screw Steamers. Mac Coll, 1887.
—— Crank and Screw, in the Mercantile Marine. Manuel, 1889.
Smith's patent screw propeller. Chappell (E.), 1840.
Specification of Invention of an Appendage to Screw Propellers. De Penning (G. A.), 1854. Add. 496.
Steam engines of Screw Propellers. Nystrom, 1852.
Theory. Fitzgerald (M. F.), 1890; Howden (J.), 1890.
Treatise, with suggestions of improvement. Bowme (J.), 1852, 1867.
What it is, and what it ought to be. Griffiths (R.), 1860.
See also Propellers; Ships and Steam Vessels.

SCULPTURE.

History. MEMES, 1834.
Improvement in hardening and preserving Plaster-Paris Casts and Moulds. CLARK (Mrs. E. T. L.), 1887.
Modelling in clay and wax. EDWARDS (M.), 1879.
Parthenon and some buildings of the Acropolis of Athens. Memoir on the works of sculpture. VISCONTI (E. R.), 1816.
Public monuments, Sculpture and our. ANONYMOUS, 1868, p. 49.

SEA. FIGUIER, 1857
Depth to which the agitation on the surface is transmitted. BÉNAZÉ, 1880.
—— Bathometer. SIEMENS, (Sir W.) 1878, 1879, p. 198.
—— The Bed of the Sea. RENARD (L.), 1877?.
Dynamic action of the Ocean in building Bars. HAUPT (L. M.), 1889.
Ebb and flow. BINNINGER, 1749; LAPLACE, 1818; RAIMONDI, 1589.
Form and position of the sea level. WOODWARD (R. S.), 1888.
Maritime Rule of the Road. HOGG (T. T.), 1890.
Movements. CIALDI, 1876.
Public and private rights to the sea and sea-shore. PHEAR, 1859.
Seamarks. EDWARDS (E. P.), 1884.

Atlantic (North), Sea Bed: Observations on its nature, its animal life, etc. WALLICH (G. C.), 1862, 1860.
—— Currents of the Atlantic and Indian Ocean. RENNELL (J.), 1832.
—— Submarine Explorations of the "Travailleur" in Atlantic and Mediterranean. MILNE EDWARDS (A.), 1882. Add. 521.
Black Sea and Mediterranean, Interchange of Water between. MAKAROFF, 1885
"Challenger" Explorations. JORDAN (W. L.), 1888.
Dover. Geological submarine. Exploration of the Straits of. POTIER and Lapparent, 1875–77.
Dover (Straits of). Currents and advance of alluvium. PLOCQ, 1863.
Europe. Water level. PULLIGNY, 1891.
Fire Island Inlet—Is it moving east or west? HAUPT (L. M.), 1889.
France (North of). GOSSELET, 1888.
Holland. Level of the sea along the coasts. ROELANTS, 1884.
—— Zuyder Zee. Level. ROELANTS, 1885.
Pacific. Maritime gateway. THWAITE (B. H.), 1893, p. 312.
Sea Beach, effect of the tidal wave on. BOWERBANK (J. S.), 1870.

SEA DEFENCES.

Principle of Construction. RANKINE (W. J. M.), 1848.

Sea dykes. CALAND (A.), 1833.

Sea Wall question. SMITH (William H.), 1849

—— Sea-walls in deep water, description of the casks used for floating large stones to construct. BREMNER, 1844.

—— Boston Harbour. Report on the Sea-wall for the preservation of Ram Head. THAYER (Col. S.), 1844.

Demerara, Sea Defences of the West Coast of. DEMERARA, 1879.

Dymchurch Sea-wall. ELLIOTT (J.), 1850.

Guiana, British, Sea Embankments of. BRUMELL, 1858.

Italy. LUIGGI, 1894. Add. 517.

Leith Sea boundary wall proposed to be constructed at the Western end of the intended new naval establishment. LEITH, 1826.

Morecambe Bay, construction of the Sea Embankment, across the Estuaries Kent and Leven in. BRUNLEES, 1855.

Portsmouth, proposed Spithead Fort, Sea works for the defence of. BROOKS (W. A.), 1861.

See also COAST.

SEA SICKNESS.

Prevention of, by use of Hydrostatic cabins to ships. ALLAN (A.), 1874.

Dover to Calais, Newhaven to Dieppe, without sea-sickness. DICEY, 1874.

Letters Patent for inventions relating to the prevention of sea-sickness by steadying the cabins of steam or sailing vessels. BESSEMER, 1872.

Scheme of Channel Communication securing perfect immunity. MUIRHEAD, 1874.

Swing Cot for Sea Voyages. HERSCHEL (Sir J. F. W.), 1861, p. 51.

SEA WATER. *See* WATER (SEA).

SEAMANSHIP. NARES, 1822.

SEAPORTS. *See* PORTS, HARBOURS

SECONDARY BATTERIES. *See* ELECTRICITY (BATTERIES).

SEDITION. Seditious Societies and Treasonable conspiracies, 1801. PARLIAMENTARY..Papers, p. 512.

SELENIUM. Action of Selenium (Photophone). JAMIESON (Andrew), 1881.

Electric Telescopy based on the use of Selenium. PAIVA, 1880.

SERFDOM. Russian life before and during the emancipation of the serfs. MORLEY, 1866.

SERMONS. LATIMER (H.), 1607.

SEWAGE (GENERAL REFERENCES). FENWICK (A.), 1874.
Bill to enable Local Authorities to deal with the Sewage and Drainage of their districts. LONDON, p. 265.
Drainage Separation Bill, 1890. PARLIAMENTARY..Papers, p. 513.
Difficulty, Sewage. LATHAM (B.), 1867.
Difficulties, Sewage, in a small borough. MOULE, 1879.
Disposal. BALFOUR (D.), 1875; FLOWER, 1877; HERING (R.), 1890; ROBINSON (Prof. H.), 1891, 1880, 1882; MARGGRAFF, 1879.
—— Collection and Disposal, A plan. WARING (J. B.), 1871.
—— Conversion to Charcoal. DANCHELL, 1886.
—— Country houses. ANONYMOUS, p. 46.
—— Economical disposal. DANCHELL, 1872.
—— Modern methods of Sewage Disposal for towns, public institutions, and isolated houses. WARING (G. E.), 1894.
—— Profitable disposal. CROOKES, 1875.
—— Sewage Disposal of Isolated Dwellings. PARRY (W. K.), 1893; WARING (G. E.), 1892.
—— Sewage disposal and privies and ashpits. ROBERTS (G. H.), 1873.
—— Town Sewage. BIRCH (R. W. P.), 1870.
—— Treatment and disposal of Town Sewage. JACOB (A.), 1867; WARDLE (T.), 1893.
—— Carlisle. Information obtained on the visit of a deputation from the Town Council of Carlisle to Doncaster. CARLISLE, 1880.
—— England, some of the chief towns of. DOWDEN, 1869.
—— European practice in Sewage Disposal. SWAN (C. H.), 1888.
—— Glasgow. Reports on Methods of Disposing of Sewage. GLASGOW, 1878.
—— —— Report. GLASGOW, 1880.
—— Lea Valley, scheme for the disposal of the Sewage of the, 1882. LEA (River).
—— Leicester, Sewage Disposal works at. ROECHLING (H. A.), 1890.
—— London. Sewage disposal for the Metropolis. MONSON, 1882, '83.
—— —— Disposal of London Sewage in the Ocean. HASSARD and Tyrrell, 1890.
—— London, Ontario. LONDON, Ontario, p. 281

SEWAGE (General References)—*continued.*

Disposal. Paris, Project of a conduit from, to the Sea. Vauthier, 1885.

—— Providence, R. I. Waring (G. E.), 1885.

—— Romford (Hope *v.* Local Board of Health for the district of Romford). Leasing of Sewage to Hope. Hope (W.), 1878. Add. 508.

—— Torquay. Marshall (P. P.), 1872.

—— Tottenham. Marshall (P. P.), 1870

—— United States. Rafter and Baker, 1894.

—— Wayne, Pa. Waring (G. E.), 1892.

—— Wirksworth Local Board. Sewerage and Sewage Disposal. McCallum (T. S.), 1892. Add. 517.

Health. Sewage and Health Annual Conferences, 1876, '79. Society...of Arts.

Hydraulic Tables showing the discharge and velocity of Sewage through Pipes. Ryde (E.), 1851.

Mechanical Appliances in Town Sewage. Waring (G. E.), 1886.

Problem. Barry, T. D., 1870; Bazalgette (C. N.), 1877; Conder, 1885; Crookes, 1873; Hille, 1877; Letheby, 1872. House, local, and universal drainage by Continuous Overflow. Newton (H. R.), 1888. Some recent phases. Robinson (Prof. H.), 1885. Sanitary Science and the Sewage Question. Angell, L., 1871. How to purify rivers. Melliss, 1875.

—— Liverpool Polytechnic Society. Chantrell, Thorburn, and Shoolbred, 1871.

—— Orange, East, Sewage Problem in. Croes, 1884.

Recent experience in the clarification of sewage. Lindley (W. H.), 1889.

Removal. Automatic Sewage Pump. Donaldson (W.).

—— Separation of Rainfall from the House Sewage. Nelson (T. J.), 1879.

Removal and Destruction of Organic Wastes. Waring (G. E.), 1886.

Report of Committee on the several modes of treating Town Sewage, 1876. Parliamentary..Papers, p. 513.

Reports of the Commission on the best mode of distributing the Sewage of Towns, 1858–65. Parliamentary..Papers, p. 513.

Screening Machine. Gower (C. F.), 1889

Tables of Towns or places where Sewage is disposed of or treated—(1) by Irrigation; (2) by Filtration; (3) by Chemical Filtration; (4) by Subsidence. 1878. Parliamentary..Papers, p. 513.

SEWAGE (General References)—*continued.*

Treatment. Rivers Purification Association, 1879; Cooper (C. H.), 1890; Hille, 1889; Paterson (J.), 1889. Report to the Tottenham and Wood Green Joint Drainage Committee. Worth (J. E.), 1890.

Utilisation. Anonymous, 1873, p. 56; British Association, 1871; Burke (U. B.), 1872; Corfield, 1871, '74; Parkin, 1862.

—— Composition, value, and utilisation of Town Sewage. Lawes (Sir J. B.), and Gilbert, 1866.

—— Utilization of the Sewage. Correspondence, Communications, 1862, 1863, '64. London, pp. 265, 268.

—— Goux's patent absorbent closet system. Target (F. N.), 1871.

—— Utilization of Sewage Water and Water of polluted streams Fowler, 1874.

—— Sanitary Management and Utilisation. Menzies, 1865.

—— Treatment and Utilisation of Sewage. Report, 1870. Paul (B. H.).

—— Leeds. Utilisation of Sewage. Leeds, p. 226.

—— London. Utilisation of Metropolitan Sewage. Ellis (T.), 1863.

—— —— Description of the plan of Messrs. Napier and Hope. Robertson (G.), 1865.

—— —— Utilization of the Sewage of London. Smith (B.), 1864.

—— —— Utilization of the Southern Sewage of the Metropolis. Smith (R.), 1867.

—— Preston. Newton (J.), 1865.

—— Trent and its Tributaries. Tarbotton (M. O.), 1875.

—— Worcester. Purchas, 1871.

SEWAGE (General References: Places).

Aldershot. Aldershot, 1870; Rawlinson (Sir R.), 1870.

Alnwick. Balfour (D.), 1892.

Barking and Crossness. Binnie (A. R.), and Dibdin, 1891.

California. Sewage Question. Hall (W. H.), 1883.

France and England. Joly (C.), 1877.

Fulham fields, application of sewage water to the gardens and grounds in. Bailey and Greig, 1866.

Heston and Isleworth. Report. Moore (B. T.), 1876.

Houghton-le-Spring. Sewage Disposal Works. Balfour (D.), 1876.

London. Kelsey, 1848; Lawes (Sir J. B.), 1855. Report of Select Committee, 1865. London, p. 267.

—— Metropolitan Board of Works. Concession of the Sewage of the Northern Area of the Metropolis. Napier (Hon. W.), 1861, '62.

SEWAGE (General References: Places)—*continued.*

London. Commission on Metropolitan Sewage Discharge. Minutes of Evidence, 1885. London, p. 266.

—— Outfall of the Main Drainage and intercepting Sewers. Austin, (A.), 1856.

Manchester. Scheme, 1888. Manchester.

Paris. Joly (C.), 1885. Agricultural utilization of Sewer Water and wholesomeness of the Seine. Cornil, 1888.

Reading. Report. Reading, 1847

Rugby, etc. Application of Sewage at Rugby, Croydon, Carlisle, and Edinburgh. London, p. 267.

Skegness. Sewage Disposal Works and Main Sewerage System. Balfour (D.), 1892.

Southampton. Sewageometer and the sites for erecting the same. Report. Simpson (J.), 1854.

Thames. Prevention of conveyance of sewage into the Thames. Martin (John), 1832.

Thames Ditton, Esher, and western portion of Long Ditton, scheme for disposing of the Sewage. Latham (B.), 1886.

Westminster, City of. Jones (J. E.), 1836.

Wimbledon. Cooper (C. H.), 1887.

SEWAGE (Deodorization of). Hofmann, 1859.

Report on the means of deodorizing and utilizing the Sewage of Towns, 1857. Parliamentary..Papers, p. 513.

SEWAGE (Disinfection). Sewage Disinfecting and Filtration Process. Hille, 1876.

SEWAGE (Filtration).

Intermittent downward filtration in combination with Surface Irrigation. Denton (J. B.), 1870, 1879, 1881, 1885.

Utilization of Sewage by filtration and irrigation. Austin (C. E.), 1867.

SEWAGE (Interception).

Application of a Reservoir Interceptor made on the type of Mouras's tank, and of a Peat Filter. Pagliani, 1891.

Intercepting lines of sewer North of the Thames. Calculations as to slope, size, velocity of flow and discharging power, 1854, 1855. London, p. 266, 267.

Interception of the Sewage of the Metropolis from the River Thames. Report, 1855. London, p. 267.

Sydney Drainage. Report on its interception and disposal. Sydney, 1877, p. 272.

SEWAGE (Irrigation). Scott (M.), 1868, p. 177.
Application to grass, cereal and root crops. Cargill, 1869.
Physiological and medical aspect. Carpenter (A.), 1870.
Report. McKie, 1879.
Report on the Application of Sewage Water to Irrigation and Agriculture in Towns, 1851. Minutes, 1852. Parliamentary Papers, p. 512.
Treatment of sewage by agricultural processes. Bonna, 1890.
Sewage Irrigation by Farmers. Birch (R. W. P.), 1878.

Beddington Works. Latham (B.), 1870.
Croydon Irrigation Fields. Latham (B.), 1867.
London. Agricultural Value of Sewage, London, 1865. London, p. 265.
—— Disposal of Sewage upon the Maplin Sands. Grantham (R. F.), 1890.
—— Distribution and Agricultural use of Town Sewage. Hope (W.), 1869.
—— Plan for diverting the Sewage of London and Westminster from the Thames, and applying it to agricultural purposes. Martin (John), 1850.
—— Metropolitan Sewage and Essex Reclamation Company's Scheme. Hemans, 1862.
—— Plan for removing and deodorizing Sewage and for applying it to the purposes of Irrigation. Stothert (H.), 1850.
London (North). Agricultural experience of 300,000 tons of London Sewage. Morton (J. C.), 1868.
Sewage Farms. Denton (J. B.), 1870.
—— Sewage Farm Competition, 1879. Report of the Judges. Royal Agricultural Soc., 1880.
—— Example of the separate system. Chadwick (Sir E.), 1885, p. 236.
—— Return of the names of boroughs, local boards, 1873. Parliamentary Papers, p. 513.
—— Will a sewage farm pay? Jones (A. S.), 1874.
—— Barking, Lodge Farm. Barking, 1872; Petre (Hon. H. W.), 1869.
—— East Molesey, proposed. Cockle, 1879.
—— Fulham. Application of Sewage Water to Market gardens. Donaldson (G.), 1848.
—— Hoddesdon. Lea Conservancy and Hoddesdon Sewage Farm, 1886. Lea (River).
—— Manchester. Report on application of liquid manure. Guy and Sherborn, 1847.

SEWAGE (Manure).

Poudrette, Manufacture by the Liernur Pneumatic Process.
Power (W. A.), 1876.

Report on Sewage Chemical Manure, 1847.
Parliamentary..Papers, p. 512.

Solid Sewage Manure, with description of Wicksteed's patent process for its manufacture. Wicksteed (T.), 1851.

England. Cultivation by Sewer and Liquid Manures in England and Scotland, 1852. Parliamentary..Papers, p. 512.

London Metropolitan Sewage Manure. Analysis of evidence. Guy, 1848. Report of Select Committee, 1846. London, p. 267. Analysis of Evidence, etc., 1846. Metropolitan Sewage. Report on Bill. London, p. 267.

—— Preparation of sewage manure. Wicksteed (T.), 1854.

—— Report on the Plans proposed for rendering available the Manure contained in Sewage Water.
Wicksteed (T.), 1845.

—— Moffatt's application to take the sewage water from the Paul's Wharf to Dowgate Dock outlet sewers for the manufacture of dry manure. Haywood (W.), 1850, p. 33.

—— Paul's Wharf. Sewage water appropriated for the manufacture of dry manure.
Simon (Sir J.) and Haywood, 1849.

Longford Manure Depôt. On the proposed Improvements at.
Warrington, Lancs., 1879.

SEWAGE (Precipitation).

A B C process. Twelve months' experience. Crookes, 1872.

—— Recent trials by the Leeds Corporation at Knostrop, Leeds.
Crookes, 1876.

—— Report. Tidy (C. M.) and Dewar, 1885.

—— Works of Native Guano Company at Leamington.
Keates, 1870.

—— Operation at Crossness. Keates, 1873.

Bolton. Precipitation Works and Sewage arrangement.
Proctor (J.), 1886.

Sewage Precipitation Works, Modern. Design, construction and management, etc. Wollheim (A.), 1892.

—— Foreign Sewage Precipitation Works.
Wollheim (A.), 1893.

Use of Lime as a disinfectant.
Miller (W. A.), Hoffmann and Frankland, 1860.

SEWAGE (Processes and Systems).

Alternating System. Bardwell's improved method of utilizing Sewage. Bardwell, 1865.

Amines system of Sewage treatment. Amines Syndicate; Cassal, 1890; Godfrey, 1889; Pocklington, 1889.

SEWAGE (Processes and Systems)—*continued.*

Conder's System, Guildford. Peak (H.), 1886.

Dry Earth System. Madras, 1865, '68. India, p. 125.

—— Moule's Dry Earth Conservancy System. India. India, p. 107.

Goux's Absorbent Closet system, 1872. Goux Manure and Sanitary Co.

Hille's system for the disposal of Sewage. Hille, 1878.

Intermittent Discharge and Continuous Overflow System of Sewering. Newton (H. R.), 1887.

Iron Process. Conder, 1886, 1888.

—— Chichester Barracks. Conder, 1887.

Liernur's Pneumatic System of Sewerage. Haywood (W.), 1876, p. 33; Krepp, 1867.

—— In Holland. Egeling, 1874; Power (W. A.), 1876.

Lime and Cement process. Scott (Gen. H. Y. D.), 1873.

Native Guano *versus* Sewage Water. Anonymous, 1849, p. 49.

Native Guano Company. Experimental operations at Crossness. London, p. 267.

—— Reports, 1869, etc. Native Guano Co.

—— See also above Sewage (Precipitation).

Our Sewage System. Bennett (F. J.).

Phosphate Sewage Process. Report. Letheby, 1871.

Sewage Systems Compared. Anonymous, 1868, p. 55.

Shone Hydro-pneumatic system. Ault, 1887; Broughton (U. H), 1887; Shone (I.), 1879, '84, '85.

—— Hydro-Pneumatic Ejectors for Sewage, Water, Sludge. Description. Shone (I.), 1892.

—— Pneumatic System. Report of the St. Anne's-on-the-Sea Land and Building Company. Maxwell and Tuke, 1876, p. 335.

Systems and methods employed. Krepp, 1867.

SEWAGE (Purification). Fairley (W.), 1889; International Water and Sewage Purification Co., 1894. Add. 511; Joly (C.), 1877.

Electrical. Worthing. Report on Mr. Hermite's Treatment of Sewage. Worthing, 1894. Add. 539.

Forbes and Price's Phosphate of Alumina process for defecating Town Sewage. Report. Voelcker (A.), 1871.

International System of Sewage Purification. Cadell (H. M.), 1891. Add. 489.

Oxygen Process, 1894. Oxygen Sewage Purification Co.

Practical Sewage Purification, with a description of the Alumino-ferric Process. Spence (P.) and Sons, 1892.

SEWAGE (PURIFICATION)—*continued.*

Processes tried at Leeds. MORANT, 1876.

Purification and Utilisation. LATHAM (B.), 1867.

Sewage Purification and Disposal in various towns. OLDBURY, 1890.

Sewage Treatment, or the purification of Water-carried sewage. HINNELL, 1891; ROBINSON (Prof. H.), and Melliss, 1877.

Spence's Patent Aluminoferric Cake for defecating, clarifying, etc., Town Sewage. SPENCE, P. and Sons, 1870.

Spongy Iron-water and Sewage Purifying Company. Prospectus and Report. SPONGY Iron-water, etc., 1882.

Webster's electrical process for the Purification of Sewage. WEBSTER (W.), 1892.

SEWAGE (SLUDGE).

Sewage Treatment and Sludge Disposal. CRIMP, 1893.

Transmission of Sewage Sludge to the Land, especially London. GOWER (C. F.), 1890.

SEWAGE (SEWER GAS).

Abolition of Sewer gas and Purification of Rivers. NICOLL, 1886.

Architect's Letter. MASTERS, 1876.

Dangers. BROWN (G. P.), 1881.

How to keep it out of houses. REYNOLDS (O.), 1876.

Influence on the public health. CARPENTER (A.), 1870.

Nature, origin, and how to protect our dwellings. VARONA (A. de), 1882.

Sewer gases and Ventilation of Sewers. LETHEBY, 1858.

SEWAGE (SEWERS, SEWERAGE). KINGSLEY, 1859; NEVILLE, 1860–61; PHOSPHATE Sewage Company, 1874; PILKINGTON (O. S.), 1881.

Act to amend the Sewers Act, 1849. PARLIAMENTARY..Papers, p. 512.

—— Sewerage Utilization Act, 1865. MICHAEL (W. H.), 1867.

Aylesford Pipes, fitness of, for the purposes of forming Sewers, and house drains. HAYWOOD (W.), 1856, p. 33.

Brick Arches for large Sewers. HERING (R.), 1878.

Double Conduit Sewerage System. LIERNUR, 1890.

Drainage. Treatise. ISAACS, 1859.

—— Sewers and Drains for populous districts. ADAMS (J. W.), 1880.

—— Drains, Traps, and Sewage Disposal. BIRD (P. H.), 1877.

Examination of pipe sewers. GRANT (J.), 1855.

Formula relating to egg-shaped sewers. HAWKINS (C. E.), 1877.

Laws. ROMNEY Marsh, 1726.

SEWAGE (SEWERS, SEWERAGE)—*continued.*

Law of Sewers and of Waters. WOOLRYCH (H. W.), 1830.

Planning and building of sewers. LATHAM (B.), 1877, p. 213.

Removal of sewage after leaving Buildings.
MIDDLETON (R. E.), 1891.

Separate system. STALEY (C.) and Pierson, 1886; WARING (G. E.), 1882.

Sewerage, Scientific and Unscientific, Sanitary and Unsanitary.
SHONE (I.), 1880.

Sewerage Systems. HERING (R.), 1881.

Statute of Sewers, with the judgments and resolutions of the judges. CALLIS, 1810.

Tables giving hydraulic mean depth and area of Circular Sewers.
DE SALIS, 1884.

Tidal River, On the movement of the water in, with reference to the position of Sewer Outfalls.
UNWIN (W. C.), 1883, p. 359.

Towns. British Agriculture. MECHI, 1860.

—— Patent relating to Sewage of Towns. POW, 1872.

—— Sewage and Sanitary Works. BRIERLEY, 1871.

See DRAINAGE OF TOWNS.

SEWAGE (SEWERAGE: PLACES).

Aberdeen. Report. LATHAM (B.), 1886.

Adelaide, Act. ADELAIDE, 1878–82.

Belfast. Accident in the Sewer beneath Corporation Square. 1889. LETTS.

Benares. Report. LATHAM (B.), 1891.

Berlin. BERLIN, 1872, 1883, etc.

Birmingham, Sewage Inquiry Committee. Report.
BIRMINGHAM, 1871.

—— Sewage Question. BIRMINGHAM, 1871.

—— Birmingham, Tame and Rea Main Sewerage District, Lower Thames Valley Main Sewerage District, and Weymouth Port Sanitary Authority. Provisional Orders of the Local Government Board. BIRMINGHAM, 1877.

—— Upper Tame Valley. Drainage and Sewerage.
SMITH (Rupert T.), 1881.

Brookline, Mass. Sewer documents.
BROOKLINE, 1876. Add. 488.

Brooklyn Waterworks and Sewers. KIRKWOOD, 1867.

—— Report on the construction of relief sewers in.
WORTHEN (W. E.), and Van Buren, 1880.

Buffalo, N.Y., Trunk Sewer of, its construction, cost, and operation.
WARING (G. E.), 1886.

Burnley. Sewage Disposal Works. BUTTON, 1893.

SEWAGE (SEWERAGE: PLACES)—*continued.*

Cambridge, diversion of the Sewage of, from the River Cam. CAMBRIDGE, 1878.

Canterbury. House connections. PILBROW, 1868.

Canton, Ohio. Report of Sewer Commissioners. CANTON, 1893.

Cape Town. Report, 1891. CAPE TOWN.

Cawnpore. Report. LATHAM (B.), 1891.

Chelsea Hospital to Battersea Bridge, low level sewer from. CHELSEA Embankment, 1871.

Chicago. Examination as to sewerage in several European cities. CHESBROUGH, 1858.

Chorley Improvement Commissioners, district within the jurisdiction of. RAWLINSON (Sir R.), 1857, p. 57.

Clevedon, Somerset. RAMMELL, 1852.

Columbia, District of. COLUMBIA, 1890.

Coventry Sewage Works. Information supplied on the occasion of the visit of the Sanitary Institute of Great Britain. RIVERS Purification Assoc., 1877.

Croydon. ARNOTT and Page, 1853.

Durham. Hawksley's scheme for main sewerage. LEE (W.), 1852.

European Sewerage Systems. HERING (R.), 1881, p. 46.

—— Sewerage Works in Europe, examination made in 1880. HERING (R.), 1881, p. 45

Finchley and Friern Barnet. LATHAM (B.), 1874.

France. Sewer Water. DURAND CLAYE, 1874, '77.

Frankfurt-on-Main. Settling tanks. LINDLEY (W. H.), 1884.

French and English systems. LEMON, 1891.

Frome. FROME, 1882.

Geneva, New York. GENEVA, 1894.

Glasgow. Sewerage. GLASGOW, 1868.

Hackney. Southern portion of the Marsh Sewer, from Lea Bridge Road to Hackney Wick. LOVEGROVE, 1874.

Hague, Sewerage of, as affecting its canals and the Beach at Scheveningen. WARING (G. E.), 1894. Add. 538.

Halifax, Nova Scotia. Scheme of Sewerage. KEATING, 1876.

Hartford, Conn. Sewer Reports. HARTFORD, 1877.

Hertford Sewage Works. Effluent Water. Report. KEATES, 1875.

Holborn and Finsbury. Plan of the Sewers, 1846. HOLBORN.

—— Public Statutes and local Acts. HOLBORN, 1830.

—— Report. ROE (J.), 1843.

Hornsey. Report on Intercepting Traps and Water-tight drains. HORNSEY Local Board, 1893. Add. 508.

—— Scheme of Sewerage and Sewage Utilization. LATHAM (B.), 1869.

SEWAGE (SEWERAGE : PLACES)—*continued.*

India, Naini-Tal. Report. LATHAM (B.), 1891.

Kilham, East Yorkshire. Works to be constructed in earthwork, concrete, etc., iron and earthenware pipes. KILHAM, 1890.

Leeds. Sewage Works. HEWSON (T.), 1884; MORANT, 1876. Reports on the means of providing an effectual Sewerage. LEATHER, 1845, '48.

Liverpool. Reports of Health Committee, 1848–63. NEWLANDS.

London. POND, 1879.

—— Abstracts of Streets, etc., showing the situations, depths, sizes, etc., of the various Public Sewers. HAYWOOD (W.), 1847, p. 34.

—— Barking Creek. Outfalls and Crossness. Reports on the condition of the Thames, with reference to the Allegations of Capt. Calver. BAZALGETTE (Sir J. W.), etc., 1878. Rejoinder. CALVER, 1878. Observations on reply to Calver's report. BURSTAL, 1878.

—— Church lane and Carrier Street, St. Giles's. GOTTO, 1849.

—— Commission, Metropolitan, of Sewers. AUSTIN, H., and Lovick, 1849; PHILLIPS (J.), 1849.

—— —— Address on Report of Poor Law Commissioners, inculpating Commissioners of Sewers. DONALDSON (T. L.), 1842.

—— —— Receipt and expenditure, 1849–54. LONDON, p. 265.

—— —— Report for 1850. LONDON, p. 267.

—— —— Act to consolidate, 1848. LONDON, p. 265.

—— —— Reports of Surveyors, 1855. LONDON, p. 266.

—— —— Consolidated Commissions of Metropolitan Sewers 1837–51. LONDON, p. 266.

—— —— Financial Proceedings, 1845–49. LONDON, p. 268.

—— —— F. Forster's plan for the main drainage of the districts south of the Thames. BAZALGETTE (Sir J. W.), 1855.

—— Commissioners of Sewers' Reports, 1847–93. HAYWOOD (W.), p. 30.

—— —— Works executed by the Commissioners of Sewers, 1832–48, '49, '50–63, '71, etc. HAYWOOD (W.), p. 33.

—— —— Metropolitan Sewers and disinfecting fluids, 1848. LONDON, p. 268.

—— Contracts for Sewer Cleansing and Reparation. HAYWOOD (W.), 1854, p. 33.

—— Drainage, Metropolitan. PHILLIPS (J.), 1849.

—— Financial State of each District of Sewers, 1850. LONDON, p. 268.

SEWAGE (Sewerage . Places)—*continued.*

London. Fleet Ditch Sewer. Proceedings relative to the Culvert and Tide flaps at the Mouth. London, p. 266.

—— Fulham Road, Sewer in the. Phillips (J.), 1847.

—— Information for those desiring to tender for Sewers, Drains, Water-closets, Cesspools, Ash-pits, etc., 1850. London, p. 266.

—— Instructions to Local Surveyors with respect to main sewers, drains and waterworks, 1859. Parliamentary..Papers, p. 513.

—— Metropolitan Sewage discharge. Chadwick (Sir E.), 1885, p. 234.

—— Metropolitan Sewers. Returns, 1849. London, p. 266. Returns, 1855. London, p. 268.

—— Northern Area of the Metropolis, Concession of the Sewage of the. Reports, 1861–62. London, p. 267.

—— Pipe Sewers, Operation of, 1855. Parliamentary..Papers, p. 513. Present state, 1855. London, p. 267. Reports on their Working, 1855. London, p. 266.

—— Reports on Sewers of the Metropolis. London, p. 266.

—— Return of rates, and length, size and cost of new works, 1843–52. London, p. 268.

—— Returns respecting the Sewage of the Metropolis, 1841. London, p. 268.

—— Royal Commission on Metropolitan Sewage Discharge. Reports, 1884–85. London, p. 268.

—— Sea, Plan for sending the sewage further towards the. Dyer (J.), 1857.

—— Select Committees on the Sewers of the Metropolis. Reports, 1823, 1834. London, p. 267.

—— Soil water, Works for the removal of. Minutes of Information, 1852. Parliamentary..Papers, p. 513.

—— Southern drainage. Fall of the extension of the main sewer from the Ravensbourne to the outlet, 1855. London, p. 268.

—— Tenders for the Southern Sewage, 1865, '66. London, p. 266. Utilization of the Southern Sewage Tenders, 1865, '67. London, p. 268. Report on the Tenders for the Metropolitan Sewage, 1863. London, p. 267.

—— Thames, new purifying sewers for the. Horeau, 1858. Observations made in the Thames in reference to the discharge of Sewage from the Metropolitan Outfalls. Latham (B.), 1883. Operations for preventing the Sewage of the Metropolis from passing into the River Thames. London, p. 267. River Thames Outfalls. Reports, 1881. London, pp. 267, 268. Reports on the discharge of metropolitan sewage into the River Thames. Calver, 1877.

SEWAGE (SEWERAGE : PLACES)—*continued.*

London. Thames (Lower) Valley Main Sewerage.
LOCAL Government Board, 1880.

—— —— Main Sewerage Board. BAZALGETTE (Sir J. W.), 1879, pp. 107, 108. Law. GLEN (A.), 1878. Notice, 1879. Petition, 1879–80. LOWER Thames.

—— —— Manor or lordship of Imber, otherwise Imworth.
IMBER, 1862.

—— Thames (Lower) Valley Main Sewerage. Reports, 1878, '79. Reasons against the scheme, 1879.
HAYWOOD (W.), p. 33.

—— Tunnel Sewer, Objections to the, proposed by the Metropolitan Sewage Manure Company. MARTIN (John), 1847.

—— Victoria Street Sewer, Estimate of the cost of the, 1859. LONDON, p. 266. Returns, 1851, '53. LONDON, p. 268.

—— Water, Supply of, to the City Sewers. Report to New River Company. MYLNE (W. C.), 1854.

Los Angelos City, Sewage of, and its sewer system.
LOS ANGELOS, 1889.

Massachusetts. Reports of the State Board of Health, 1887, etc.
MASSACHUSETTS.

Melbourne. MANSERGH, 1890.

Memphis, Tenn. Report on the conditions of sewers of.
WARING (G. E.), 1893.

Paris. BELGRAND, 1875.

Philadelphia, future sewerage requirements of the City of.
HERING (R.), 1880.

Plymouth. Report. LATHAM (B.), 1888.

Portsmouth. PORTSMOUTH, 1887.

Preston. Sewerage and private improvements, 1858.
NEWTON (J.).

Providence, U.S. System of sewerage. PROVIDENCE, 1874, 1876.

Reading, District of the Borough of. Report.
MARSHALL (J. G. B.), 1858.

Richmond, etc. Sewage of the parishes of Richmond, Barnes, Mortlake, Kew and Petersham. An account of the Works for its collection and disposal. RICHMOND, Surrey, 1891.

Southampton. Sanitary Works and Sewage disposal.
BENNETT (W. B. G.), 1891.

—— Utilization of town refuse. BENNETT (W. B. G.), 1889.

Surrey and Kent Sewers. Reports relating to the Sewage, and of the surveying officers, etc. SURREY, 1843, 1847.

Tynemouth. Works for the borough of.
RAWLINSON (Sir R.), 1857.

Victoria. Report of the Sewerage and Water Commission of.
VICTORIA, Australia, 1856. Add. 538.

SEWAGE (SEWERAGE: PLACES)—*continued.*

West Ham. Works for the district of. RAWLINSON (Sir R.), 1862.

Westminster Commissioners of Sewers. Account of all sums rated by. WESTMINSTER, 1846. Laws, Ordinances, and Constitutions. Act, 1847. Statutes of Sewers, 1839. Complaint of the constitution of the Commission, 1847. WESTMINSTER. Westminster Sewers. PHILLIPS (J.), 1847.

Westminster and part of Middlesex. Construction of Sewers. HERTSLET, 1846.

See also DRAINAGE OF TOWNS.

SEWAGE (SEWERS, CLEANSING AND FLUSHING).

Cleansing and sewerage of Cities. BAUMEISTER, 1890, 1891.

Description of Machinery and Apparatus for Cleansing. BLADES, 1853.

Deptford Storm Overflows. Report. DEPTFORD, 1870. Add. 496.

Exeter. Cleansing the rising Mains. BOULNOIS, 1882.

London. Causes of accumulation of deposit in sewers, and the description of a new Flushing Apparatus used in the Holborn and Finsbury Divisions. ROE (J.), 1842.

—— Report on the Cleansing and Ventilation of Sewers, 1886. LONDON, p. 267.

—— Supply of Water to the Sewers. HAYWOOD (W.), 1854, p. 33.

—— Flushing work done and the cost per mile in the Surrey and Kent divisions of the Metropolitan Sewers, 1850. LONDON, p. 268.

SEWAGE (SEWERS, VENTILATION). CRESWELL, 1884; CRIMP, 1891; ELLICE-CLARK, 1874; FORD (A. H.), 1889; HAYWOOD (W.), 1858, p. 33; MCKIE, 1878; READ (R.), 1891; REEVES (R. H.), 1889.

Application of Charcoal. HAYWOOD (W.), 1858, p. 33. Results of the experiment of applying charcoal to the Sewer Ventilators. LETHEBY and Haywood, 1862.

New system. BOULNOIS, 1880.

Some principles which govern the Ventilation of Sewers. ROWAN (T.), 1883.

De Beauvoir Town and Dalston Wards, Ventilation in the sewers. LOVEGROVE, 1866.

Fulham Vestry. FULHAM, 1887, '88.

Hornsey. Report, 1881. HORNSEY Local Board.

Llandaff. Report. WARING (T.), 1884.

London. Correspondence on the use of the Steam jet in purifying the pestilential Sewer in Friar Street, Borough, 1850. LONDON, p. 266.

—— Ventilation of Sewers. Reports, 1866–82. LONDON, p. 268.

Salford, Borough of. FOWLER, 1873.

SEWING MACHINE. Müller (Ernst), 1887.
History, construction and application. Herzberg, 1864.
Manual. Urquhart (T.), 1881.

SHADOWS. Rules for their projection. Gwilt, 1833.

SHAFTING.
Elastic coupling for transmission Shafting. Raffard, 1889.
Modern Shafting. Bale, 1894.
Strength of Shafting. Cruickshank, 1880.
Whirling and Vibration of Shafts.
Dunkerley (S.), 1894. Add. 497.

SHAFTS.
Cast iron tubing used in Shaft sinking. Brown (J.), 1861. Use of cement in. Brough, 1893.
Method of sinking shafts. Coxe (E. B.), 1872.
Poetsch freezing method of shaft-sinking.
Poetsch (F. H.), 1888. Add. 528.

SHALE. Physical conditions existing in Shale-distilling retorts.
Rowan (F. J.), 1891, p. 134.

SHEATHING (Metal). Immersion of, in Glasgow harbour, 1879.
Deas.

SHELLS.
Conchyliometry. Moseley (H.), 1842.
Geometrical forms of turbinated and discoid shells.
Moseley, 1838.

SHINGLE.
Motions of Shingle beaches. Palmer (H. R.), 1834.
Movement of Shingle and the Goodwin Sands. Observations on.
Westbrook (Commander), 1844.
New Zealand, east coast. Culcheth, 1884.
Normandy, Coasts of. Lamblardie, 1789.
Sussex and Kent. Laws which govern the course of the Shingle on the coasts of, with their application to the ports of Rye, Folkestone and Dover.
Williams (Lt.-Col.), 1839. Add. 539.
Withernsea. Removing shingle from the foreshore at. Report of the case of the Queen at the prosecution of Williams *v.* Nicholson. Nicholson (E.), 1870. Add. 523.

SHIPS AND STEAM VESSELS. Cadet, 1860; Murray (R.), 1858; Prinsep (G. A.), 1830.
American Law relating to Steamboats. Hoffmann, etc., 1840.
Ancient and Modern Ships. Dunlop, 1883.
"Anthracite," machinery of the Steamer. Report.
Anthracite (S. S.), 1880.

SHIPS AND STEAM VESSELS—*continued.*

"Arabia" and "La Plata" machinery. NAPIER (R.), 1850.

Board of Trade Instructions as to the survey of the hull, equipments and machinery, 1883.
PARLIAMENTARY..Papers, p. 514.

Boats. Management of ships' boats. LACON, 1852.

—— New method of lowering and raising ship boats.
FORBES (J.), 1855.

—— How to lower Ships' Boats. HAYES (E.), 1855.

—— Boat Lowering, boat's gear, and life-saving appliances.
SIMPSON (H. J.), 1891.

Bottoms of Iron and Steel Ships, Destructive effects of Red Lead upon the. ANONYMOUS, 1872, p. 51. Protection of the bottoms from Concussions and from foulings.
GRANTHAM (J.). 1862.

Bottoms of Iron, Wood, Coppered or Zincked Vessels, Compositions for. PEACOCK (G.), and Buchan, 1870.

"Brésil." Combined vapour of water and ether (Du Trembley system). Trial voyage from Marseilles to the Crimea.
GOUIN, 1855.

Capsize, Why Ships. FISHBOURNE, 1882.

Channel Steamer, Description of proposed.
WALKER (John), 1870.

Corrosion and Fouling. Anti-fouling Compositions.
HOLZAPFEL, 1889.

Corrosion of iron and steel ships. DAVIS (T. H.), 1886.

—— Fouling and corrosion of Iron Ships. YOUNG (C. F. T.), 1867.

Cunard Steamship Company Guide. CUNARD, 1878, 1893.

Curves (new) for the stability of ships in all possible positions.
DAYMARD, 1883.

Curtis's inventions. CURTIS (W. J.), 1840.

Development of the Steamship. CHADWICK (F. E.), 1887.

Diagonal Principle of Iron Shipbuilding.
TAYLERSON (R.), 1854, '59.

Dictionary, naval, steamers and sailing vessels.
BONNEFOUX and Paris, 1848–51.

Dismasting of large iron sailing ships. JAMES (S. H.), 1874.

Distribution of Energy. SOLIANI, 1891.

Displacement (estimate of) and hydrostatic stability.
MARTINENQ, 1888.

Efficiency of steamships from the owner's point of view.
DYER, 1888.

Examination of Engineers, 1st, 2nd and 3rd Classes. Germany.
AMMAN, 1885.

Elastic iron ship. MARTIN (John), 1829.

SHIPS AND STEAM VESSELS—*continued.*

"Experiment," The, an iron vessel fitted with rotary engine and with Hays' auxiliary steam power, voyage. HAYS (C. D.), 1845.

Fire. Improvements to arrest the progress of fire. HOLDSWORTH (A. H.), 1842.

Forms of Ships and Boats. BLAND, 1868. Proper form of Ships. BOURNE (J.), 1867. Best form of fast vessel, its propeller and engines. DE PENNING, 1889. Form in accordance with the laws of fluids. RANSFORD, 1864. Steamship: its form, strength, and propeller. WILLIAMS (John E.), 1875.

Free Board (Approximate). WYMER (F. W.), 1875.

Gales and Ships. MATHER, 1858.

"Great Britain" steamship. CLAXTON, 1845.

Heating of Ships and Cargoes, waste of heat in steamers. FROUD (A. G.), 1891.

Hodgetts' Safety Ship. HODGETTS (J. F.), 1892.

Hydrostatic Ship-mechanics, properties and advantages. ANONYMOUS, 1815, p. 44.

Improvement in Vessels, Description. ROBERTS (R.), 1853.

Incline (Ship) at the First Cataract (Egypt). FOWLER (Sir J.), 1873.

Inclined plane for transhipment at Beauval. MALLET (A.), 1892.

Indian Coals as fuel. DANVERS, 1867.

Iron Ships. Iron-cased ships. HALSTED (E. P.), 1861.

—— Iron ships with sails. LOSSIGNOL, 1866.

—— The first iron boat and its inventor, John Wilkinson. BAILEY (W. H.), 1886.

—— Iron Hulls for Western River Steamboats. ALLEN (T.), 1876.

—— Management. EVANS (G.), 1844.

Isochronism of Oscillation in Ships. FROUDE (W.), 1863.

Laws which govern the motion of Steam Vessels. BARLOW (P. W.), 1834.

Life-Boat protection, efforts made to ensure all ships having proper. SOCIETY for the Encouragement of Arts, 1873, p. 222.

Load-line. Report of the Load-line Committee to the Board of Trade, 1885. PARLIAMENTARY..Papers, p. 514.

Log-book, Improved, for steam vessels. BORRIE, 1849.

Machine for carrying vessels or ships out of or into any harbour, port or river, against wind and tide. HULLS, 1737, 1860.

Machinery. Steamships. HALDANE, 1893.

Magnetical errors, compensations, and corrections with special reference to Iron Ships and their compasses. AIRY (Sir G. B.), 1864, p. 23.

SHIPS AND STEAM VESSELS—*continued.*

Manning of Steamships and Sailing Vessels.
ALLINGHAM (W.), 1894. Add. 480.

Masting Ships. CHATFIELD, 1834.

—— Masting Ships and Mast-making. FINCHAM, 1854.

—— Masting, Mast-making, and Rigging of Ships.
KIPPING, 1866.

—— Art of Apparelling and fitting of any ship with masts, yards, and cordage. BOND (H.), 1655.

Mechanical Appliances on Board Ship. MACKENZIE (T.), 1893.

Mechanical and Electrical means of traction.
LÉVY (M.) and Pavie, 1894. Add. 515.

Mercantile Marine (British); its past, present, and probable future. BLACKMORE, 1890.

National Ship Buoying and Towing Company. Prospectus, 1872.
NATIONAL Ship B. and T. Co.

Practical Navigation, with reference to the increased speed of Steamers. JOHNSON (H. M. W. P.), 1891.

"Nelson" Steamer, trial and comparison between old and new paddle floats and wheels. NEWENHAM and Fuller, 1845.

Ocean Passenger Steamships. BILES, 1893.

Origin and progress of the Ship. STEINITZ (F.), 1849.

Oscillating ship, movement of an, on a calm sea.
BÉNAZÉ and Risbec, 1873.

Parabolic Construction of Ships. NYSTROM, 1863.

Passenger Accommodation. Board of Trade Instructions as to survey of passenger Accommodation, crew spaces, lights and fog signals, 1883. PARLIAMENTARY..Papers, p. 514.

Player's Patent Furnace, applied to the boilers of the "Anthracite" steam vessel. PARKES and Manby, 1839–40.

Port Helm, Law of. COLOMB and Brent, 1866.

Propellers, Application of Manganese Bronze as a material for.
ANONYMOUS, 1883, p. 50.

—— New means of propelling ships. CLARK (E. H.), 1884.

—— Modes of propelling Ships, and their defects.
ENGLISH (T.), 1863.

—— Steam Boats, and the subject of propelling vessels by steam power. Memorial to the House of Commons.
TAYLOR (James), of Cumnock, 1824

—— Fundamental formula in the theory of Steamship Propulsion.
MANSEL (R.), 1891.

—— Law of the Power required for different speeds of the same Steam Vessel. MANSEL (R.), 1879.

—— Propulsion of vessels. BODMER (J. G.), 1844.

See also SCREW PROPELLERS.

SHIPS AND STEAM VESSELS—*continued.*

Railways, Ships and. ANONYMOUS, 1846, p. 55.

Report of Select Committee on Steam Boats, 1817. PARLIAMENTARY. . Papers, p. 514.

Resistance, Ship. FROUDE (R. E.), 1894. Add. 501. Comparative resistances of long ships of several types. FROUDE (W.), 1876. Fundamental principles of resistance. FROUDE (W.), 1876.

Resistance to Keels. Experiments at the port of Brest on models of "L'Océan." DUDEBOUT, 1881.

Rigging of ships at sea. LESCALLIER, 1791.

—— Key to the leading of rigging and to practical seamanship. LEVER, 1808.

Rolling of Ships. MCNAUGHT, 1874; RANKINE (W. J. M.), 1864.

—— At sea, effective wave slope in. FROUDE (W.), 1873.

—— Instrument for automatically recording. FROUDE (W.), 1873.

—— Graphic integration on the equation of. FROUDE (W.), 1875.

—— Influence of resistance upon. FROUDE (W.), 1872.

—— Practical limits of. FROUDE (W.), 1865.

—— Remarks on Scott Russell's paper on. FROUDE (W.), 1864.

"Royal (The) Charter." AIRY (Sir G. B.), 1859, p. 17.

Sails for Steamers. BIANCHI, 1888.

Screw Steamer, description and plans of a. ANONYMOUS, p. 43.

Ship-Manœuvrer. FOULERTON, 1846.

Shoal Water, effect of, on Speeds of Ships. ISHERWOOD, 1892.

Signals of Distress. Correspondence concerning the use of a Special Rocket, 1873, '78. PARLIAMENTARY. . Papers, p. 514.

Slewing, method of, a ship without the aid of the Rudder. AIRY (Sir G. B.), 1864, p. 18.

Specification of Ships and Vessels. STANHOPE (Earl), 1807.

Stability of Ships. REED (Sir E. J.), 1885.

—— Stability, propulsion and sea-going qualities of Ships. BRITISH Association, 1869.

—— Use of stability calculations in regulating the loading of Steamers. ELGAR, 1884.

—— Variation of Stability with draught of water in Ships. ELGAR, 1884.

SHIPS AND STEAM VESSELS (STEAM NAVIGATION). AIRY (Sir G. B.), 1858, p. 23; CURR, 1847; HOSEASON, 1841; OTWAY, 1834; ROSS (Sir J.), 1837; RUSSELL (John S.), 1841. Early proposals. RIGAUD (S. P.), 1838; RIGAUD, 1838. App. 573. Chronological history. PREBLE, 1883.

Apparatus. LEDIEU, 1862–65.

Economic utilisation of Steam Ships. PARIS (F. E.), 1860.

Effective employment of steam power, more particularly in Mercantile Navigation. M'KONOCHIE, 1829.

SHIPS AND STEAM VESSELS (STEAM NAVIGATION)—*continued.*

Extended and made profitable. M'KONOCHIE, 1829.

Improvements, Lecture on. SARGENT (J. O.), 1844.

Inventor, Right of Patrick Miller to be regarded as the first. MILLER (Wm. Hy.), 1862.

Locomotion by steam. Conjectures on its future effects. SMITH (Horace), 1836.

Mechanical means by which Vessels are propelled by Steam power. HALE, 1868.

New principle. MARTIN (John), 1829.

Ocean. RAINEY, 1858. Ocean Mail Steamers. GREGORY (J.), 1868.

Origin and Progress. WOODCROFT (B.), 1848.

Progress and development of ocean steam navigation. FRASER-MACDONALD, 1893.

Progress of Steam Shipping during the last quarter of a century. HOLT (A.), 1878.

Remarks on Steam Navigation and its protection, regulation and encouragement. TREDGOLD (T.), 1825.

Sailing vessels, Method of adapting auxiliary Steam Power to. HAYS (C. D.), 1845.

Statement of the position and prospects of Steam Navigation in 1840. ANONYMOUS, p. 56.

"Steamship." PERIODICAL PUBLICATIONS, p. 25.

Steering of Screw Steamers. HUTCHINSON (W. E.), 1890.

Stevens' new method of propelling. STEVENS (J. L.), 1828.

Tables of the steam marine of all parts of the globe contrasted with the steam power of the British Empire. BOYMAN, 1840.

Taylor and Miller. Rise and early progress, shewing its origin in the experiments of. TAYLOR (James), of Cumnock, 1840.

Thoughts on Steam Locomotion, with hints for economizing fuel in steam vessels. ANONYMOUS, 1840, p. 57.

Tonnage. Observations respecting the admeasurement of Tonnage, 1867. PARLIAMENTARY..Papers, p. 514.

—— Papers on exemptions from Tonnage granted by the Board of Trade, 1873. PARLIAMENTARY..Papers, p. 514.

—— Report of Select Committee on Merchant Ships (Measurement of Tonnage) Bill, 1874. PARLIAMENTARY..Papers, p. 514.

—— Report of Commissioners on the operation of the Law for the measurement of Tonnage, 1881. PARLIAMENTARY..Papers, p. 514.

—— Tonnage of Transport Vessels. VAUTHIER, 1893.

Transatlantic Lines and Steamships. MAGINNIS, 1881, '92.

Unseaworthy Ships. Reports of Royal Commissioners to inquire into the unseaworthiness of British registered ships, 1873–74. PARLIAMENTARY..Papers, p. 514.

SHIPS AND STEAM VESSELS (STEAM NAVIGATION)—*continued.*

Unseaworthy Ships. Return of Board of Trade, 1873.
PARLIAMENTARY..Papers, p. 514.

Unsinkable Ship. New application of compressed air.
CROUZET and Colombat, 1874.

Ventilation. Sailing and Steam Vessels. RITCHIE (R.), 1843.

Vessels of Iron and Wood.
FAIRBAIRN (Sir W.), etc., 1858, p. 404.

"Ville de Douvres." Experiments made on the paddle-wheel steamer. ISHERWOOD, 1892.

Water Bulkheads for reducing the temperature and arresting fire in ships or vessels. HOLDSWORTH (A. H.), 1852.

Watertight Bulkheads. Report of Committee on spacing and construction of Watertight Bulkheads in Ships of the Mercantile Marine, 1891. PARLIAMENTARY..Papers, p. 515.

Watt's inventions, application of, to Modern Steam Navigation.
RUSSELL (John S.), 1867.

"White (J. M.)." U.S. mail steamer. J. M. WHITE, 1878.

Wooden Ships, remarkable durability of some. BOWDEN, 1815.

Algesiras, steamer. ALGESIRAS, 1857.

Atlantic Ferry. Ships, Men and Working. MAGINNIS, 1892.

Atlantic Steam Navigation. ANONYMOUS, 1837. Add. 480.

Australia. Prospectus.
AUSTRALIAN DIRECT STEAM NAV. Co., 1853.

Australia. The different routes for connecting London and Sydney compared. BOGUE (A.), 1848. Add. 486.

—— Australian Direct Steam Navigation Company *viâ* Panama. The Routes to Australia considered.
AUSTRALIAN Steam Navigation Co., 1854. Add. 483.

Bombay and Suez. Steam communication. Account of the "Hugh Lindsay's" four voyages.
WILSON (Commander J. H.), 1833.

Calcutta, Madras, Ceylon, and Suez. Plan for establishing direct steam communication between. INDIA, 1839. Add. 510.

Calcutta and Suez. Proposal for establishing a general steam communication between. TURTON (T. E. M.), 1839.

Canada. Steamboat Inspection. CANADA, 1878, p. 217.

Cape of Good Hope, Australia and New Zealand. Steam Communication with, suggested as the means of promoting Emigration. JERNINGHAM (F.), 1848. Add. 512.

Cape of Good Hope, St. Helena, Sierra Leone, Pernambuco, etc., and Great Britain, Steam Navigation between.
GORDON (J.), 1846.

Channel Service between Folkestone and Boulogne. Its improvement and the vessels proposed to be employed.
SCOTT (M.), 1871, p. 177.

SHIPS AND STEAM VESSELS (STEAM NAVIGATION)—*continued.*

Channel Service between Folkestone and Boulogne. Sailing Directions for English Channel. WHITE (M.), 1841, 1850.

Continent, Steam Communication with the, past and present. SEATON (A. E.), 1893.

Cork as a packet station for communication with America. LE FANU, 1851.

Dover and Calais from early times to the present day. PATERSON (J. D.), 1894. Add. 527.

Dublin Steam Packet Company. Form of Contract for building steam-vessels, engines, and boilers, 1836. DUBLIN.

Dublin and Liverpool Steam Packet Company. Forms of Specification for building steam vessels and engines. SHAW (James C.), 1836.

Eastern Steam Navigation Company. Report, 1853. EASTERN Steam Navigation.

East Indian Steam Navigation Company. ANDERSON (A.), 1840.

—— Observations on employing Steam power in navigating ships between this country and the East Indies. SEAWARD (J. and S.), 1829, 1834.

Europe to America. AMERICAN and Colonial, 1825.

Europe and Brazil. PARIDANT, 1855.

Europe (Central), Steam Communications in. Map. POTENTI, 1846.

Firth of Forth. BOSWALL, 1831.

French posts in the Mediterranean, Steam packet service for the administration of the. MEDITERRANEAN Sea, 1837. Add. 519.

Great Britain. Commercial Steam fleet. RAVENHILL, 1877.

—— Mail communication by steam between Great Britain and the eastern and western parts of the World. M'QUEEN, 1838.

"Great Britain" Atlantic steamship of 3,500 tons. WEALE (J.), 1847.

Hamburg-American Navigation Company. HAACK and Busley, 1893.

India. Steam Navigation with. BARBER (J.), 1837, 1839; EAST India Company, 1839; EAST INDIA Company, 1837. Add. 498; EAST INDIA and China Association, 1839. Add. 498; GRINDLAY (M.), 1837. Add. 504; HALL (S.), 1837; INDIA, 1837. Add. 509.

—— Communication with India in large steamships by the Cape of Good Hope. Ross (Sir J.), 1838.

—— India, British, Steam Navigation in. PRINSEP (G. A.), 1830.

—— Indian Directory for the guidance of Commanders of Steamers and Sailing Vessels. TAYLOR (A. D.), 1874.

—— Routes of Communication with India. TYLER (H. W.), 1866.

SHIPS AND STEAM VESSELS (STEAM NAVIGATION)—*continued.*

India. India and China. Analysis of 100 voyages to and from, with remarks on the advantages of steam power, etc.
WISE (H.), 1839.

—— India, Steam Navigation to, *viâ* Egypt and Red Sea.
WAGHORN (T.), '35.

—— Communication with India, 1834, '37, '39, '40, '41.
INDIA, p. 99–100.

—— *Viâ* the Red Sea. HOLMES (W. D.), 1838; INDIA, 1839, p. 100.

—— Steam Communication with India, *viâ* the Red Sea.
CURTIS (T. A.), 1839.

—— Red Sea and the Cape of Good Hope routes compared.
SEAWARD (J.), 1837.

—— England and India, *viâ* Red Sea. Observations on the proposed Steam Communication between.
GREENLAW (C. B.), 1833. Add. 504.

—— Steam Communication between India and Suez.
GREENLAW (C. B.), 1834.

Ireland. Report on Communication with.
WALKER (James), 1843, p. 394.

Japan. Mail Steam Ship Company. Tracks of the Nippon Yushen Kaisha Regular Lines. JAPAN Mail, 1890.

London, Port of. Mooring of Ships. BELSON, 1786.

Nicaragua, Steam Navigation through.
ATLANTIC AND PACIFIC STEAM NAVIGATION COMPY. 1859.

Nippon Yusen Kaisha. Handbook of Information for Passengers and Shippers by Steamers of.
NIPPON Yusen Kaisha, 1894. Add. 524.

North German Lloyds. HAACK and Busley, 1893.

Orient Line of Steamers between England and Australia.
LOFTIE, 1884, '90.

Oriental Inland Steam Company. BOURNE (J.), 1863.

Pacific, Steam Navigation in the. Statements, etc., relative to the Establishment of. WHEELWRIGHT (W.), 1838.

P. and O. Steam Navigation Co.
PENINSULAR and ORIENTAL, 1866.

Red Sea, Steam Communication by the. LARDNER, 1837.

Southampton. Chamber of Commerce's Reply to the Pretentions of Falmouth and Plymouth as a West India Mail Packet Station. SOUTHAMPTON, 1867.

Spain, Great Britain, and America, Steam Boats in.
ANONYMOUS, 1831, p. 40.

United Kingdom, Return of the Steam Vessels registered in the, 1860–70. PARLIAMENTARY..Papers, p. 514.

United States. Steam Navigation. PURDY, 1880.

SHIPS AND STEAM VESSELS (STEAM NAVIGATION)—*continued.*

United States. Lines of the United States and Canada.
ALLEN (W. F.), 1886.

—— Steam boats of the. MARESTIER, 1824; RENWICK (J.), 1838.

See also MERCANTILE MARINE.

SHIPS AND STEAM VESSELS (ACCIDENTS).

Foundering of Ships, and how to prevent it.
TERRY (S. H.), 1882.

Plan to prevent ships foundering at sea. WATSON (Ralph), 1829.

Plans for preventing accidents on board of Steam Vessels.
NAPIER (R.), etc., 1839.

Regulations for preventing Collisions at Sea in pursuance of Merchant Shipping Act Amendment Act, 1862.
PARLIAMENTARY..Papers, p. 514.

Report of Select Committee on the frequent Calamities by Steam Navigation, 1831. PARLIAMENTARY..Papers, p. 514.

Report on Steam Vessel Accidents, 1839.
PARLIAMENTARY..Papers, p. 514.

"City of Paris." Inquiry into the causes of the accident, 1890.
CITY of Paris.

"Daphne" disaster, Report, 1883. DAPHNE.

"Druid" Steamboat, Explosion of the. DRUID, 1873.

"Garnet," Loss of the Steamer, 1881. Correspondence relative to the inquiry held at Dundee. GARNET (S. S.).

"Gipsy Queen," Stranding of the, 1879. GIPSY QUEEN.

"Jeannette," Loss of the Steamer. JEANNETTE, 1883.

"Knight and Templar," Report on the loss of, 1873.
KNIGHT and Templar.

"Marion," operation of blowing up with gunpowder the sunken hulk in Auckland Harbour, 1867. WEAVER (W.), 1867.

"Monitor," the, Loss of. BUTTS, 1885.

SHIPS AND STEAM VESSELS (LIGHTS AND LIGHTING).

Improvements in Ship Signal Lights. KENWARD, 1844, '89.

Reports on the Subject of Ships' Lights, 1873.
PARLIAMENTARY..Papers, p. 514.

Ship Lights and Collisions. KENWARD, 1893.

SHIPS AND STEAM VESSELS (PERFORMANCE).

Capability of Steamships. ATHERTON, 1853. Report of Committee. BRITISH Association, 1860–61.

Computation of the probable engine-power and speed of proposed ships. RANKINE (W. J. M.), 1864.

Performance of Steam vessels. MOORSOM (C. R.), 1856, '60.

Power and speed. BURY (W.), 1878.

SHIPS AND STEAM VESSELS (PERFORMANCE)—*continued.*

Profitable speed for fully-laden Cargo-steamer.
NAPIER (James R.), 1865.

Speed and carrying of Screw Steamers. DENNY (W.), 1882.

Test Trial and Shipping Improvement Association.
HENDERSON (A.), 1865.

Theory of the Manœuvres of Vessels. PITOT, 1732.

SHIPS AND STEAM VESSELS (PROPULSION).
See p. 272; *also* SCREW PROPELLERS.

SHIPS AND STEAM VESSELS (SUNKEN, RAISING VESSELS).
See WRECKS.

SHIPS AND STEAM VESSELS (SHEATHING). Copper Sheathing, protection of. DAVY (Sir H.), Works, vol. 6.

SHIPS AND STEAM VESSELS (WEIGHT, MEASUREMENT, CONSTRUCTION, REPAIR, ETC.)

Construction of Ships and vessels, proving the form of bottom now used to be destructive of life and property.
ST. BARBE (K.) and Stuard, 1803.

Correct method of admeasuring Ships, 1830.
PARSONS (W.), 1830.

Descriptive measurement of Ships and Steamers, defining their tonnage, displacement, capacity. HENDERSON (A.), 1854.

Laws for the admeasurement of tonnage. MOORSOM (G.), 1853.

Measuring and registering the tonnage of Shipping.
BRITISH Association, 1857.

Note on the law of the variation of the weight of woodwork of ships with the size. NORMAND (A.), 1892. Add. 524.

SHIPS AND STEAM VESSELS (SHIPPING).

Annual Statement of the Navigation and Shipping of the United Kingdom, 1874, etc. PARLIAMENTARY..Papers, p. 513.

British Merchant Shipping, 1874, Tables showing the progress of.
PARLIAMENTARY..Papers, p. 513.

Law of Shipping. WILKINSON (J. J.), 1843.

—— British Shipping Code, 1870. Alterations in the present law made by its enactment. FARRER, 1870.

—— Deck Loads Act, Canada, 1873. CANADA, p. 218.

Laws of foreign countries relating to Railway and Shipping Disasters, Reports, 1873. PARLIAMENTARY..Papers, p. 501.

Mercantile Navy List. PERIODICAL PUBLICATIONS, p. 19.

Merchant Shipping, History. LINDSAY, 1874.

Ship-owner's and Shipmaster's Guide. JOEL, 1879.

Shipping Stability and Stowage. HOLT (H. F.), 1892.

SHIPS AND STEAM VESSELS (SHIPPING)—*continued.*

Shipping Statistics. Report of Committee.
FAIRBAIRN (Sir W.), etc., 1858, p. 404.

Ships and Canoes of extra-European peoples. PARIS (T. E.), 1850.

Ships of all lands. PARIS (J. E.), 1877–86.

SHIPS AND STEAM VESSELS (STEAM YACHTS). Steam-yacht "Siesta," hull, engine, and boiler. ISHERWOOD, 1883.

Steam Yachts and Launches, Machinery and Management.
KUNHARDT, 1887.

SHIPS AND STEAM VESSELS (SHIPS OF WAR).
BARNABY (Sir N.), 1893.

Accounts and Papers, 1805–6. PARLIAMENTARY..Papers, p. 490.

Arming vessels of War, mode of. BENTHAM, 1828.

Broadsides, means of directing the Fire of Ships'.
JERNINGHAM, 1861.

Cement, mis-use of, on iron Transport Ships.
KING (W. P.), 1872.

Circular Sterns. SEPPING (Sir R.), 1822.

Collision, etc. Mrs. Wood's patents for defending vessels against the effects of collision, attacks of guns, torpedoes, etc.
REED (Sir E. J.), 1886.

Construction of Ironclad Ships of War. CAMPBELL (T. H.), 1860.

Construction and stowage of Vessels of War. FISHBOURNE.

Construction of a battleship. LANGMAID and Gaisford, 1893.

Cruisers, and war by privateers. DISLERE (P.), 1876.

Cupola, claim to the invention. HUMBLE (R.), 1870.

—— German Cupolas and Armour and the French Counterfeit.
SCHUTZ, 1892.

Decay in Ships of War, cause of. BENTHAM, 1814.

Equipment, displacement, etc., Calculations relating to.
EDYE (J.) 1832, '59.

Gunboats, Steam, of shallow draught and high speed.
GRAVATT, 1854.

Improved Ships of War. SCOTT (M.), 1871, p. 176.

Iron Shield. CAMPBELL (T. H.), 1861, 1864–65.

Modern Ships of War. REED (Sir E. J.) and Simpson.

Monitor of 1854. ERICSSON, 1854.

Monitors, the. ERICSSON, 1885.

Past and future of Ships of War. BOURNE (J.), 1877

Power, Comparative, of War Ships, and how to value it.
ANONYMOUS, 1885. Add. 481.

Progressive Trials of the Steam Barge of the Commandant of the New York Navy Yard. ISHERWOOD, 1889.

SHIPS AND STEAM VESSELS (SHIPS OF WAR)—*continued.*

Sails. True method of finding the proper Area of the Sails for ships of the line. ANONYMOUS, 1749, p. 58.

Stability, Propulsion and Sea-going qualities of Ships. Report. MERRIFIELD, 1869.

Turret, Revolving. HUMBLE (R.), 1870.

Turret Ships. American system. BOURNE (J.), 1866.

—— Turret and Tripod systems of Captain Cowper Coles. HENWOOD (C. F.), 1867.

—— Designs for Turret ships, submitted by C. F. Henwood HENWOOD (C. F.), 1874.

—— Turret Ships, ironclad rams, etc. REED (Sir E. J.), 1869.

—— Turret systems of armour-clad War Vessels. COLES, 1866.

—— English *v.* American Cupolas. A comparison between Capt. Coles's and Capt. Ericsson's turrets. COLES, 1864.

—— Sea-going turret ships. COLES, 1865.

—— Opinion of the Press on Turrets. COLES, 1866.

—— The Turret *v.* the Broadside system. COLES, 1867.

—— Views of Capt. Coles on Ironclads. COLES, 1866.

SHIPS (SHIPS OF WAR, NAVIES).

Accounts under the Naval Defence Act, 1889. PARLIAMENTARY..Papers, p. 491.

Armour-clad Ships and Batteries, Return of all, built by contract, 1855. PARLIAMENTARY..Papers, p. 490.

Channel Fleet, Return relating to the Ships in the. PARLIAMENTARY..Papers, p. 490.

—— Return of vessels in the Channel and Home Waters, 1891 PARLIAMENTARY..Papers, p. 491.

Cochrane's (Lord) Expedition, Steamboats in. PALMA, 1876.

Condition of the Ships of the Fleet. FISHBOURNE, 1874.

Contracts for the Building of Ships for H.M. Navy. Report of Committee on, 1884. PARLIAMENTARY..Papers, p. 491.

Designs for ships, Return relative to, 1807. PARLIAMENTARY..Papers, p. 490.

Designs for Ships of War. Report on the ships of the "Cyclops" and "Devastation" classes, 1871. PARLIAMENTARY..Papers, p. 490.

—— Report of Committee, 1872. Report of Admirals Elliot, Ryder and Robinson, 1872. PARLIAMENTARY..Papers, p. 490.

Fleet of the future in 1862; or, England without a fleet. RUSSELL (John S.), 1862.

—— Iron or wood? A reply to Sir Howard Douglas's conclusions in favour of Wooden Walls. RUSSELL (John S.), 1861.

Froude's Report on ships built upon the inclined plane principle. 1874. PARLIAMENTARY..Papers, p. 490.

SHIPS (Ships of War, Navies)—*continued.*

High-pressure Steam in the Steam Vessels of the British Navy. Seaward (J.) and Capel, 1846.

Ironclad Ships. Reed (Sir E. J.), 1869.

—— Ironclads and Merchant Ships. Fishbourne, 1874.

—— Returns of iron-plated ships and batteries, 1864–75. Parliamentary..Papers, p. 490.

—— Return of all iron vessels, 1850. Parliamentary..Papers, p. 490.

Lost otherwise than in action. Return of H.M. Ships, 1815–1840. Parliamentary..Papers, p. 491.

Masts and yards of the Royal Navy, dimensions of. Kipping, 1866.

Names of the Steamships in the Navy. Return of, 1874–79. Parliamentary..Papers, p. 490.

Necessity for the systematic training of Naval officers in the Art of Manœuvring Ships under Steam. Long (S.), 1884.

Screw fleet of the Navy. Halsted (E. P.), 1850.

Shipping. Return showing the amount of, from 1865–6 to 1880–1. Parliamentary..Papers, p. 491.

State, Account of the, of Ships in the Programme for 1879–80. Parliamentary..Papers, p. 491.

Steam Boilers, frequent renewal of, in our Ironclad fleet. Bailey (James), 1874.

Steam Propellers. Conclusions and recommendations of Committee on existing types and designs of Propelling Machinery and Boilers in H.M. Ships, 1893. Parliamentary..Papers, p. 489.

Steam Navy of Great Britain. Gustaffson, 1847.

—— Return of comparative strength of our Naval Squadrons abroad, 1886–91. Parliamentary..Papers, p. 491.

—— Return of the Tonnage of the Ships and Vessels of the Royal Navy, 1879. Parliamentary..Papers, p. 491.

—— Results of Trials made in Her Majesty's screw ships and vessels, 1870–84. Parliamentary..Papers, p. 490.

Turret Navy for the future. Halsted (E. P.), 1866.

—— Turret Ships. Paris (T. E.), 1868.

—— Report of Admiralty Committee on Turret Ships, 1866. Parliamentary..Papers, p. 490.

Vessels, Returns of, not armour-plated, 1864–75. Parliamentary..Papers, p. 490.

Volunteers. Report of Committee on encouragement to, to enter H.M. Ships of War, 1780. Parliamentary..Papers, p. 519.

Wages of Mates and Petty Officers, 1850–90. Parliamentary..Papers, p. 515.

SHIPS (SHIPS OF WAR, NAVIES)—*continued.*

British, French, Italian, German, and Russian large Ships of War. BARNABY (Sir N.), 1886.
English, French and German Ironclads. TROMP (T. H. A.), 1880.
French Warships. DREDGE, 1892.
United States. Naval and Mail Steamers. STUART (C. B.), 1853
—— Our new Cruisers, U.S. BOWLES (F. T.), 1886
—— Ships of War, U.S. BOWLES (F. T.), 1885
World. War Ships and Navies of. KING (J. W.), 1881.
—— Navies of the World. Giving plans, armament, armour, etc. of the 20 principal nations. VERY (E. W.), 1880.

"Affondatore," iron armour-clad Turret Ship of the Royal Italian Navy. HENWOOD (C. F.), 1875.
"Bulldog" (H.M.S.), Voyage, 1860. WALLICK.
"Captain" (H.M.S.), Loss of. FISHBOURNE, 1870; HAY (Sir J. C. D.), 1871.
—— Proceedings of the Court Martial. CAPTAIN, 1871.
—— Reply from Sir Spencer Robinson. CAPTAIN, 1871.
"Devastation" as a "fighting machine." HALSTED (E. P.), 1873.
"Gallatin." Trial of the Steam Machinery of the United States revenue steamer. LORING and Emery, 1875.
"Greyhound" (H.M.S.). Resistance of a full-sized ship. FROUDE (W.), 1874.
—— Experiments to determine the resistance experienced by large ships moving through smooth water. FROUDE (W.), 1874.
"Inflexible" (H.M.S.). Design, 1877–78. INFLEXIBLE.
"Latona" (H.M.S.). Return of Performance upon experimental Voyage to Malta in 1891. LATONA.
"Leven," "Conway," and "Griper" (H.M.SS.). Experiments for correcting the local attraction of those vessels. BARLOW (P.), 1824.
"Medina" (H.M.S.), bearing down, in Port Leone. HARRIS (R.), 1841.
"Melville" (H.M.S.), in Chusan harbour. HARRIS (R.), 1841.
"Monarch" (H.B.M. Ironclad.) THURSTON (R. H.), 1870, p. 309.
—— Report of Trials of the ships "Monarch" and "Captain." MONARCH, 1870.
"Sulphur" (H.M.S.), Voyage. BELCHER, 1848.
"Thétis (la)." Indicators installed on the armoured corvette. MADAMET, 1875.
"Vanguard" (H.M.S.). Court Martial held to inquire into her loss. VANGUARD (H.M.S.), 1876.
"Victoria" (H.M.S.). Court Martial to inquire into the cause of her loss. VICTORIA (H.M.S.), 1893, p. 379.

SHIPS OF WAR (Armour Plates).

Bethlehem Armour and recent Armour experiments. Jaques, 1891.

Development of Armour for Naval Use. Very (E. W.), 1883.

Distribution of Armour in Ships of War, 1885. Parliamentary..Papers, p. 491.

Face-Hardened Armour, Present Status of. Discussion on Capt. Sampson's paper. Jaques (W. H.), 1894. Add. 512.

"Gibraltar" Shields. Report, 1868. Parliamentary..Papers, p. 474.

Naval Armour. Chalmers (J.), 1865.

Naval Ordnance Proving Ground Annapolis. Trial of 11½ all steel Armour plate. Jaques, 1891.

Question (Armour Plate). Jaques (W. H.), 1894. Add. 512.

See also Armour Plates.

SHIPBUILDING. Bevan (G. P.), Industries, vol. 10; Chapman (F. H. de), 1820; Fincham, 1852; Fishbourne, 1884; Redmund (D.), 1826.

Composite Ships. Method of constructing. Scott (M.), 1874, p. 176.

Construction and movements. Bouguer, 1746.

Directions for laying off Ships on the mould-loft floor. Fincham, 1840; Pook, 1866.

English Shipbuilding. Anonymous, 1691. Add. 480.

English ships. (Structure of). Dupin, 1817.

Improvements in Constructing Ships. Novello, 1889.

Iron. Grantham (J.), 1842, '58, '68. Form and Construction of. Wheelwright (W.), 1838. Handbook. Schliek (O.), 1888. History and Progress. Fairbairn (Sir W.), 1860, 1865, p. 403.

Iron and Steel. Reed (Sir E. J.), 1869.

Manual (Shipbuilders'). Griffiths (J. W.), 1856.

Marine Architecture. Charnock (J.), 1800.

Marine and Naval Architecture. Griffiths (J. W.), 1853, '57.

Method of bevelling iron frames in shipbuilding. Rankine (W. J. M.), 1865, p. 82.

Modern practice of shipbuilding in Iron and Steel. Thearle (S. J. P.), 1886.

Naval Architecture. Anonymous, 1880, p. 42; Hauser, 1886; Pollard and Dudebout, 1890–93; Scott (M.), 1874, p. 176.

—— Current Fallacies. Fischer Treuenfeld, 1871.

—— Dictionary of terms used in. Weale (J.), 1849–50, 1875

—— 18th and 19th centuries. Dupin, 1815.

—— Elements and practice. Knowles (J.), 1822; Steel (D.), 1805.

SHIPBUILDING—*continued.*

Naval Architecture. Great Britain, present state. BEAMISH, 1836.

—— Improvements. LANG (O.), 1847. Explanation of certain Improvements. WALTERS (J.), 1815. Recent Improvements. PEARSE W., 1881.

—— Lectures. FISHBOURNE, 1846.

—— Manual. WHITE (Sir William Henry), K.C.B., 1877, '82, '94.

—— Modern system. RUSSELL (J. Scott), 1865.

—— New system. ANNESLEY W., 1822.

—— Papers. MORGAN (W.) and Creuze, 1827–31.

—— Pocket Book. Naval Architect's and Shipbuilder's. MACKROW, 1879, 1889.

—— Practical guide. BOUSQUET (G.), 1869.

—— Principles (fundamental). MANSEL (R.), 1881.

—— Remarks on the Building and Working of Ships and Steamers. LITTLE, 1893.

—— Rudiments. PEAKE (J.), 1849, '67.

—— Science in its relation to the laws of nature. WILLSON (H. B.), 1863.

—— Scientific study. ELGAR, 1884.

—— Sea-going Steam Vessels, construction, proportions, and power best adapted to. WALL (Lt. R.), 1839. Add. 538.

—— Steel for Shipbuilding. Extended Report, 1877. LLOYD'S Register.

—— Symonds' (Sir W.) principles vindicated. SYMONDS (Sir W.), 1845.

—— Technical. Shipowners and Shipbuilders in their technical relationships. DENNY, 1893.

—— Theory. ATWOOD, 1700; BLACKBURN (I.), 1836; THEARLE (S. J. P.), 1877.

—— Theory and practice. KNOWLES (J.), 1822; MURRAY (Andrew), 1861; MURRAY (M.), 1754; RANKINE (W. J. M.), 1866; WILSON (Theodore D.), 1880.

Oblique Riders. Employment of, and other alterations in the construction of ships. YOUNG (Dr. T.), 1814.

Ocean and River service. Construction of ships for. SOMMERFELDT (H. A.), 1860–61.

Twin screw Vessels. Their Construction and Propulsion. SYMONDS (Capt. T. E.), 1864.

United States, Ship-building Industry of the. HALL (Henry), 1884.

Wilcox's improved system of Steamship construction. Return relative to. WILCOX ( ), 1876.

Yacht designing. KEMP, 1876.

SHIPWRECKS. *See* WRECKS.

SHIPWRIGHTS of the River Thames. Scale of prices for job work on old ships. CLARK (N. G.), 1825.

SHORING. See BUILDINGS.

SIEGES. Lille, Namur. DEIDIER, 1742.

SIGHT. Hemiopsy. AIRY, Sir G. B. 1865, p. 19.

SIGNALS.

Coast Signals, improvement in. DOUGLASS (Sir J. N.), 1884.
Compressed air sound signals. RIBIÈRE (C.), 1893.
Different modes of communication by. GAMBLE, 1797.
Mercantile Navy Signal Code. WALES (Lt. B. J.), 1841.
Optional Audible Signal. BURN (R.), 1874.
Signals at Sea. PEREZ DE LA SALA, 1868, '87.
United States. Annual report of the Signal Officer for 1871, etc., and Work of the Signal Service in the Arctic Regions, 1883. UNITED States, p. 356.

SIGNBOARDS. London. HAYWOOD (W.), 1863, p. 34

SILK. BEVAN (G. P.)., Industries, vol. 5 ; VILLON (A. M.), 1890.

Origin and present state of Silk Manufacture. PORTER (G. R.), 1831.
Silk Machinery. NEFTEL, 1880.
Silk question settled. AMERICAN Institute, 1844.
Australia, Western. Silk Growing and silkworms, and the trees on which they live. WESTERN Australia, 1871, p. 423.
India. Culture and Manufacture of Raw Silk in India. EAST India Company, 1836.
Lahore. Silk experiment, 1856. INDIA, p. 122.
Perak. Experimental Culture of Silkworms in. WRAY (L.), 1893. Add. 539.

SILVER.

Depreciation of Silver. Report on, 1876. PARLIAMENTARY..Papers, p. 515.
Metallurgy. EISSLER, 1889 ; PERCY (J.), 1880. Silver and Lead. LAMBORN, 1861.
Metallurgy of Silver in the United States. EGLESTON, 1887, '90.
Treatise. O'BRIEN, 1884.
Workers' (Silver) Guide. BLOEDE, 1867.

SILVER MINES.

Mining and Metallurgy. PHILLIPS (J. A.), 1867.

Africa and America. Confirmation of laws and liberties to all King's subjects. HOUGHTON, 1694.

Alice Gold and Silver Mining Company. Report on the Property. MAYNARD (G. W.), 1882.

Mexico. PETHERICK (J.) and Clemes, 1867. Silver Mines of Fresnillo. FRESNILLO, 1834.

Montana Company Report, 1886. MONTANA Co.

Nevada and California, Processes of Extraction. KÜSTEL, 1868.

Příbram. GÖBL, 1892.

Rabenstein Silver-Lead Mine. Report. SPON (E.), 1883.

Scamander Silver and Gold Deposits. Report. THUREAU (G.), 1886.

Tasmania, West, Montagu County. Report on the Mount Zeehan and Dundas Silver and Argentiferous Lead Lodes and other ore deposits. ZEEHAN Mount, Tasmania, 1888; '90.

Utah. Last Chance Silver Mining Company of. ADLEY (1877).

Vazeeri Rupi, the silver country of the Vazeers in Kulu. CALVERT, 1873.

SILVER ORES.

Patio and Cazo Process for amalgamating Silver Ores. EGLESTON, 1884.

Příbram, Bohemia. PŘÍBRAM, 1875.

Roasting and extraction of the metal without quicksilver. KÜSTEL, 1880.

Tasmania. Heazlewood Silver, Lead, and other ore deposits. HEAZLEWOOD, 1888.

United States. Leaching gold and silver ores in the West. EGLESTON, 1883.

SKID (SELF-ACTING). GRIVEL, 1840.

SKULL, Human, found near Southport. READE, 1883.

SLAG. Economic Uses of Blast Furnace Slag. NURSEY, 1873.

SLATE. Analyses. BURGOYNE (Sir J. F.), 1868.

Slate quarries as an investment. BOWER (J.), 1865.

Slate and Slate Quarrying. DAVIES (D. C.), 1878.

Strength and weathering qualities of Roofing Slates. MERRIMAN, 1892.

Wales, North, Slate Trade. KELLOW, 1868.

SLAUGHTER HOUSES.

Abolition of private slaughter houses in towns. HARDWICKE, 1874.

Public slaughter houses. GRANTHAM (R. B.), 1848.

Skinning-house practice. WEHMER (R.), 1893.

SLAUGHTER HOUSES—*continued.*

Accrington, Specifications. ACCRINGTON, 1889.
Berlin. ORTH, 1872.
Buda-Pest. HENNICKE and Hude.
Carlisle. Public slaughter houses. McKIE, 1885.
Germany, France, Belgium, Italy, England and Switzerland. HENNICKE (J.), 1866.
Lisbon. SOUSA, 1878.
London. Rules and regulations for slaughter houses, 1852. LONDON, p. 269.
Melbourne. Design for an Abattoir. MILLAR (John), 1859.
Munich. ZENETTI, 1880.
Nelson, Lancashire. Report on private slaughter houses. NELSON, 1893.
Newcastle-upon-Tyne. Proposed Abattoirs and new site for Cattle Market. LAWS, 1886.
Paris. Abattoirs. THOMAS (Ernest), 1873.
Paris and London. KREISS, 1877.

SLIDE RULE. SCHULZ VON STRASSNICKI, 1843; THACKER (E.), 1882.
New Calculating Slide Rule. FULLER (G.), 1879.
Logarithmic Slide Rule. RINECKER, 1879.
Spiral Slide Rule. FULLER (G.), 1879.

SLIDE VALVE. *See* STEAM ENGINES, Valves, p. 724.

SLIP. Apparent negative slip. RANKINE (W. J. M.), 1867.

SLIPWAYS.
Evans Bay. Patent Slip. GEORGE (J. R.), 1873.

SLUICES.
Construction of large Sluices for irrigation and navigation. STONEY (F. G. M.), 1876.
Construction of the planking of a sluice. TARTE and Toovey, 1860.
Discharge of Sluices and Weirs under various heads. MACONCHY (G. C.), 1893–94. Add. 517.
Mechanical lifting apparatus. PETRI, 1888.
Lake of Bientina. CIALDI, 1857. Add. 492.

SMELTING.
Iron Smelters' Pocket Analysis Book. WHITWELL (T.), 1877.
Machines. HAUER (J. von), 1876.
Tinners' Ready Reckoner, or, Sure guide to the Smelting House. THOMPSON (James), 1827.

See also COPPER ORES.

SMITHING. The Smithy and Forge. CRANE, 1883.
Blacksmith. GUETTIER, 1887.
Smithing in the Middle Ages and Renaissance.
HEFNER-ALTENECK, 1870.

SMOKE.
Abatement, Smoke. BARLOW (P. W.), 1882; SOMERVILLE (J.), 1885.
—— Act for Abatement of Smoke Nuisance, 1853.
PARLIAMENTARY..Papers, p. 515.
—— Exhibition, 1882. Papers. SIEMENS (F.), 1882. Reports of the Testing Engineer, etc., and the Jurors of the S. Kensington Exhibition. SMOKE Abatement Com., 1883. Smokeless Grates and Furnaces. HANKS.
—— Glasgow and West of Scotland Association. Report.
GLASGOW, 1893.
—— York. Health of Towns' Assoc. Report on the Smoke Nuisance. YORK, City of, 1852.
Combustion, Smoke. HOOD, 1879. Report. Burguignon's "fumivores." PAYEN, 1827.
Condensation of Carbon Particles. IRVINE, 1889.
Consumption. PARKES (J.), 1822. By furnaces, steam engines, etc. Report. HAYWOOD (W.), 1853, p. 33. Return relative to experiments on Consumption of Smoke in the Navy, 1860.
PARLIAMENTARY..Papers, p. 515.
Disposal of Smoke. GOODACRE, 1891.
Edinburgh Smoke doctor. CARMICHAEL and Brownlie, 1757.
Natural process of dissolution. DULIER, 1892.
Nuisance, Smoke. BREWSTER (E. H. G.), 1883; DIRCKS and Co. 1854. Smoke Nuisance Act. ANONYMOUS, 1855. Add. 481. Letters on its operations, with remarks on the formation and prevention of Smoke. WILLIAMS (C. W.), 1856.
—— Nuisance occasioned by the Smoke from Manufactories and Steam Vessels on the Thames, 1841. LONDON, p. 269.
—— Solution. BUCHANAN, 1852. Copy of communications from the *Times* and *Nature*. SIEMENS (Sir W.), 1880, p. 198.
Prevention of Smoke. FYFE, 1842; WILLIAMS (C. W.), 1856.
—— Account of the Patent and other methods of Smoke preventing or consuming WEST (W.), 1842.
—— Combustion of Coal.
WILLIAMS (C. W.), 1840, '41, '54, '58.
—— London Smoke Plague, its origin, dangers and remedy.
THWAITE (B. H.), 1891, p. 312.
—— Reports, 1843–45. PARLIAMENTARY..Papers, p. 515.
—— Working of the Sennett system. BEDBROOK, 1891; KENNEDY (A. B. W.), 1891.
—— Smokeless Fireplaces, chimney valves, etc. ARNOTT, 1855.

SMUGGLING. Reports, 1783, '84.
PARLIAMENTARY. .Papers, p. 515

SNOW.
Accumulations of Snow, means of preventing. BRAET, 1860.
Melting Snow, experiments in. HAYWOOD (W.), 1871, p. 34.
Melting Snow by Clarke's apparatus.
HAYWOOD (W.), 1881, p. 34.
Observations on Snow. ANDREWS (T.), 1886.
Removal of Snow in London after the Storm, Jan. 18, 1881.
HAYWOOD (W.), p. 34.
Removal of snow from the roads of Turin. PRINETTI, 1881.
Snow Slides. CUNINGHAM (G. C.), 1892.

SOAP.
Manufacture. CALMELS and Saulnier, 1887.
Manufacture of Toilet Soaps. WRIGHT (C. R. A.), 1885.

SOCIALISM. LIBERTY and Property Defence League.

SOCIETIES (BRITISH).
Learned Societies and Printing Clubs of the United Kingdom.
HUME, 1847, '53.
Scientific London. BECKER (B. H.), 1874.
Subjects of local interest recommended for investigation by Provincial Scientific Societies.
HOPKINSON (J.), F.L.S., 1890.
Yearbook of the Scientific and Learned Societies.
PERIODICAL PUBLICATIONS, p. 26.

Barnsley. South Yorkshire Viewers' Association. First annual Report and Transactions, 1858.
SOUTH Yorkshire Viewers' Assoc.
Bedford. Society for the Protection of Life and Property from Lightning. Objects and Rules.
SOCIETY for the Protection of Property from Lightning, 1886.
Birmingham. Association for the improvement of geometrical teaching. ASSOCIATION, 1878.
—— Architectural Association.
BIRMINGHAM Arch. Assoc., 1887–88.
—— Philosophical Institution. BIRMINGHAM, 1836–41.
Bristol Naturalists' Society, 1886–87. BRISTOL.
Camborne. Mining Association and Institute of Cornwall. Transactions, 1887, etc. MINING Assoc.
Cambridge Camden Society. CAMBRIDGE, C. S., 1840.
—— Philosophical Society. CAMBRIDGE, P. S., 1843, etc.

SOCIETIES (BRITISH)—*continued.*

Chesterfield and Midland Counties Institution of Engineers.
CHESTERFIELD, 1873, etc.

Cornwall. Royal Cornwall Polytechnic Society. Annual Report, 1833, etc. ROYAL Cornwall Polytechnic Soc., 1833, etc.

—— Royal Geological Society of Cornwall. Transactions, 1818–71. ROYAL Geolog. Soc. of Cornwall.

—— Royal Inst. of Cornwall. Journal, 1865–88.
ROYAL Inst. of Cornwall.

Dublin. Institution of Civil Engineers of Ireland. Transactions, 1845, etc. INSTITUTION of C.E.I.

—— Royal Dublin Society. Journal, 1868–75, Proceedings, 1878, etc., Transactions, 1877, etc., and Report of the distribution of premiums in the Drawing and Modelling Schools, 1843. ROYAL Dublin Soc.

—— Royal Geological Society of Dublin. Journal, 1833–64.
ROYAL Geolog. Soc. of Dublin.

—— Royal Geological Society of Ireland. Journal, 1867–87.
ROYAL Geolog. Soc. of Ireland.

—— Royal Historical and Archæological Association of Ireland. Journal, 1889, etc.
ROYAL Hist. and Arch. Assoc. of Ireland.

—— Royal Irish Academy Proceedings, Transactions, List of Papers, Catalogue of Museum, etc., 1787, etc.
ROYAL Irish Academy.

—— Royal Society of Antiquaries of Ireland. Journal of Proceedings. ROYAL Soc. of Antiquaries of Ireland, 1890.

Dudley. South Staffordshire and East Worcestershire Institute of Mining Engineers. Transactions, 1875–86.
SOUTH Stafford, etc., Inst.

Edinburgh. East of Scotland Engineering Association.
EAST of Scotland, 1893, etc.

—— Edinburgh and Leith Engineers' Society. Proceedings.
EDINBURGH and Leith, 1875–80.

—— Royal Scottish Geographical Society. Magazine.
ROYAL Scottish Geog. Soc, 1885, etc.

—— Royal Scottish Society of Arts. Conference on Technical Education, 1868; Report of Council, 1825; and Transactions, 1841. ROYAL Scottish Soc. of Arts.

—— Royal Society of Edinburgh. Proceedings, 1832, etc., Transactions, 1788, etc., Laws, 1836.
ROYAL Soc. of Edinburgh.

—— Sanitary Protection Association, objects.
SANITARY Protection Assoc., 1878.

Falmouth. Miners' Association of Cornwall and Devon. Proceedings, 1864–84. MINERS' Assoc.

SOCIETIES (British)—*continued.*

Glasgow. Clyde Steam and Sailing Shipowners' Associations. Clyde, 1887–88.

—— Glasgow and Clydesdale Statistical Society. Constitution and Regulations. Glasgow, 1836.

—— Geological Society. Transactions. Glasgow, 1865–80.

—— Institution of Engineers and Shipbuilders in Scotland. Transactions, etc., 1858, etc. Institution.

—— Philosophical Society. Proceedings. Glasgow, 1844, etc.

Gloucester. Institution of Permanent Way Inspectors. Proceedings, Rules, 1884, etc. Institution of P. W. I.

Greenock Philosophical Society. Papers. Greenock, 1865–87.

Hamilton. Hamilton Association Journal and Proceedings. Hamilton Assoc., 1885.

—— Mining Institute of Scotland. Transactions, 1879, etc. Mining Institute.

Hull and District Institution of Engineers and Naval Architects. Transactions, 1886–89. Hull.

Leeds. Society for Philosophical Experiments and Conversation. Minutes. Society for Philos. Experiments, 1795.

Liverpool. Literary and Philosophical Society. Proceedings, 1845, etc. Liverpool, p. 246.

—— Liverpool Architectural Society. Report, 1877. Liverpool, p. 248.

—— Liverpool Engineering Society. Transactions, 1881. Liverpool, p. 248.

—— Liverpool Geological Society. Proceedings, 1859–79. Liverpool, p. 248.

—— Liverpool Mechanics' Institution. Reports, 1833, etc. Liverpool, p. 248

—— Liverpool Polytechnic Society's Transactions, 1841–56. Journal, 1865, etc. Liverpool, p. 248.

London. London Aeronautical Society. Reports, Rules. Aeronautical, 1866.

—— Anthropological Society. Anthropological Soc.

—— Archæological Institute. Archæological Inst., 1848.

—— Architectural Publication Society. Architectural P.S.

—— Architectural Society. Architectural Soc.

—— Association of Chambers of Commerce. Association of C. of C., 1887.

—— Auctioneer's Institute of the United Kingdom. Auctioneer's Institute, 1893.

—— British Association for the Advancement of Science. British Association, 1835, etc. Report of the 33rd meeting of. British Association, 1863. Add. 488.

—— British Iron Trade Association. British Iron Trade.

SOCIETIES (British)—*continued.*

London. British Record Society. British Record, 1893.

—— Chemical Society. Chemical Soc., 1849, etc.

—— Civil and Mechanical Engineers' Society. Papers. Civil and Mechanical.

—— Clerks of Works Association. Clerks, 1883, etc.

—— Clerks of Works Society. Clerks, 1843–49.

—— Devonshire Association. Proceedings. Devonshire, 1863–88.

—— East India and China Association. Report, 1839. East India.

—— East India Association. Journal. East India, 1867, etc.

—— Geological Society. Proceedings, Journals, Transactions. Geological Society, 1824, etc.

—— —— Classified Index to Transactions, Proceedings and Journal. Ormerod, 1858, '70.

—— Geologists' Association. Reports and Proceedings. Geologists', 1865, etc.

—— Imperial Institute. Report, 1892; Annual Report, 1893; Year Book, 1892, etc. Description and plans, 1892. Imperial Institute.

—— Incorporated Association of Municipal and County Engineers. Proceedings, 1875, etc. Incorporated Assoc.

—— Incorporated Gas Institute. Reports, 1869–89, '91, etc. Incorporated Gas.

—— Incorporated Institution of Gas Engineers. Transactions. Incorporated Inst., 1892, etc.

—— Incorporated Law Society. Calendar, 1883–91. Incorporated Law.

—— Institute of Builders. Proceedings, 1887. Institute of Builders.

—— Institute of Chartered Accountants. Description of Building, 1893. Institute of C.A.

—— Institute of Chemistry. Proceedings, 1887–88. Institute of C.

—— Institute of Marine Engineers. Transactions, 1891, etc. Institute of Marine Engineers. Add. 510.

—— Institute of Patent Agents. Transactions, 1882, etc. Institute of P.A.

—— Institute of Secretaries. Proceedings, etc., 1893. Institute of S.

—— Institute of the Fine Arts. Laws, etc., 1847. Institute of F.A.

—— Institution of Civil Engineers. Transactions, 1836–42; Proceedings, 1837, etc. Minutes and Funds, 1855. Institution of C.E.

SOCIETIES (British)—*continued.*

London. Institution of Electrical Engineers. Journal, 1872, etc.
INSTITUTION of E.E.

—— Institution of Locomotion for Steam Transport and Agriculture. Prospectus, 1833. INSTITUTION, p. 135.

—— Institution of Mechanical Engineers. Proceedings, 1847, etc.
INSTITUTION of M.E.

—— Institution of Mining and Metallurgy. Transactions, 1892–3.
INSTITUTION of Mining, etc. Add. 510.

—— Institution of Naval Architects. Transactions, 1860, etc.
INSTITUTION of N.A.

—— International Association for a uniform Decimal System. Reports, Memorial, etc. INTERNATIONAL Assoc.

—— Iron and Steel Institute. Transactions, Journal, etc., 1869, etc. IRON and Steel.

—— Junior Engineering Society. Papers, 1886.
JUNIOR Engineering.

—— Library: organ of the Library Association of United Kingdom. PERIODICAL PUBLICATIONS, p. 18.

—— London and Croydon Railway Mechanics' Institution. Rules and Regulations, 1840. LONDON and Croydon.

—— London Architectural Society Essays, 1808–10.
LONDON Architectural.

—— London Association of Foremen Engineers' Journal. Proceedings of, at 13th and 14th Anniversary Dinners, 1866, 1871–84. LONDON Association.

—— London Electrical Society. Transactions and Proceedings, 1841–43. LONDON Electrical Society.

—— London Institution. Journal, 1871–75.
LONDON Institution.

—— Meteorological Society of Great Britain. Transactions, 1839.
METEOROLOGICAL Society.

—— Musical Association. Proceedings, 1874–78.
MUSICAL Assoc.

—— National Association for the Promotion of Science. Transactions, 1857–84. NATIONAL Association.

—— National Smoke Abatement Institution. Report, 1884.
NATIONAL Smoke.

—— Pasteur Institute. Mansion House Fund, 1889.
PASTEUR Institute.

—— Pharmaceutical Society of Great Britain.
PHARMACEUTICAL Soc., 1884.

—— Photographic Society. PHOTOGRAPHIC Soc.

—— Physical Society. PHYSICAL Soc.

—— Polytechnic Young Men's Christian Institute.
POLYTECHNIC, 1886–87.

SOCIETIES (British)—*continued.*

London. Royal Agricultural Society of England. Journal. Minutes of proceedings at the Chemical Committee and report of the judges in the Sewage Farm Competition, 1879. Royal Agricultural Soc., 1840–90, 1876 and 1880.

—— —— History. Johnson (C. W.) and Hare, 1843.

—— Royal Astronomical Society of London. Memoirs and Notices. Royal Astronomical Soc., 1822 and 1827–67.

—— —— New Standard Scale. Baily, 1836.

—— Royal Colonial Institute. Proceedings, Regulations and Catalogue of Library. Royal Colonial Institute, 1860, '69 and '86.

—— Royal Geographical Society. Journal, 1831–80. Proceedings, 1857–93, etc. Royal Geographical Society.

—— Royal Horticultural Society. Report on the Orchid Conference held at South Kensington. Royal Horticultural Society, 1886.

—— Royal Institute of British Architects. Transactions, Proceedings, Catalogue, Charter, etc., 1836, etc. Royal Institute of British Architects.

—— Royal Institution. Founder and first professors. Jones (Henry B.), 1874. Journal, Proceedings, Catalogues, Lectures, Charter, etc., 1816, etc. Royal Institution of Great Britain.

—— Royal Meteorological Society Journal, Proceedings, Catalogues, Reports of the Council, etc., 1851, etc. Royal Meteorological Society.

—— Royal National Lifeboat Institution. Annual Reports, 1866, etc. Royal National Lifeboat Institution.

—— Royal Society, London. Observations on the delivery of the Medals. Babbage (C.), 1856. Philosophical Transactions, 1665, etc. Proceedings, 1832, etc. Catalogues, Government Grant, etc. Royal Society. History. Birch (T.), 1756; Sprat (T.), 1734; Thomson (T.), 1812; Weld (C. R.), 1848.

—— Royal Society of Literature. Constitution, Regulations, and Transactions, 1826–39. Royal Society of Literature.

—— Royal Statistical Society. Almanack for 1875 and Catalogue of the Library, 1884. Royal Statistical Soc. Add. 531. Journal, 1839, etc. Royal Statistical Society.

—— Royal United Service Institution. Journal, Catalogue, and Lectures addressed to Volunteer officers. Royal United Service Institution, 1858, 1865, 1873. A visit to the Institution in 1849. Royal United Service Institution. Add. 531.

SOCIETIES (BRITISH)—*continued.*

London. Sanitary Institute of Great Britain and the Parkes Museum of Hygiene. TARBOTTON (M. O.), 1887. Transactions, 1880, etc. Congresses held at Stafford, 1878, and Leamington, 1877, and Report of the Council, 1892. SANITARY Institute.

—— Scientific Society of London. Proceedings. SCIENTIFIC Society of London, 1839–40.

—— Shipmasters' Society Papers. SHIPMASTERS' Society, 1890.

—— Shipwrecked Fishermen and Mariners' Royal Benevolent Society. 51st Annual Report. SHIPWRECKED Fishermen and Mariners, etc., 1890.

—— Smeatonian Society of Civil Engineers. Account, 1771–1888. SMEATONIAN Society, 1888.

—— Society for the Improvement of Naval Architecture. Report. SOCIETY for the Improvement of Naval Architecture, 1704.

—— Society for Philosophical Experiments and Conversations. Minutes. HIGGINS (B.), 1795.

—— Society for Psychical Research. Proceedings. SOCIETY for Psychical Research, 1883–4.

—— Society of Architects. Proceedings, 1888–93, and Journal, 1894. SOCIETY of Architects.

—— Society of Arts. Machines and Models in the Repository. BAILEY (A. M.), 1776. Transactions, Charter, Sessional papers, Journal, List of Lecturers and subjects. Proceedings of Conferences held by the India Committee, etc. SOCIETY for the Encouragement of Arts, etc., 1788–1845, 1852, 1854, 1869, pp. 221, 222.

—— Society of Engineers. Transactions. SOCIETY of Engineers, 1861.

—— Society of Mathematicians. Collection of mathematical questions published in the Ladies' Diary from 1704–1760, with Solutions. SOCIETY of Mathematicians, 1774.

—— Society of Medical Officers of Health. Annual Report. SOCIETY of Medical Officers of Health, 1877.

—— Southern District Association of Gas Engineers and Managers. Reports, 1881, 1889. SOUTHERN District Association.

—— Surveyors' Association. Rules. SURVEYORS' Association, 1850.

—— Surveyors' Institution. Transactions, 1869, etc. Professional Notes, 1887, etc. Catalogues of Library, 1874, '83, '93, and Forestry Coll., 1894. SURVEYORS' Institution.

—— Victoria Institute, or Philosophical Society of Great Britain. Its origin and objects. VICTORIA Institute, 1865.

Manchester, Association of Engineers. Transactions, 1885. Anniversary Dinner, 1882. Visit to Northwich, etc., 1884. MANCHESTER Association.

SOCIETIES (British)—*continued.*

Manchester. District Institution of Gas Engineers. Reports, 1872–74. Papers on Scrubbers. Manchester District.

—— Geological Society. Transactions, 1841–88. Manchester Geological Society.

—— Literary and Philosophical Society. Memoirs, 1785, etc. Catalogue of the Library, 1875. Manchester, etc.

—— Scientific and Mechanical Society. Proceedings, 1873–74. Manchester, etc.

—— Society of Chemical Industry. Journal. Society of Chemical Industry, 1882.

Merthyr Tydfil. South Wales Institute of Engineers. Transactions, 1859, etc. South Wales Institute, etc.

Middlesbrough. Cleveland Institution of Engineers. Cleveland, 1870.

Newcastle. Federated Institution of Mining Engineers. Federated, 1892, etc.

—— Midland Institute of Mining, Civil, and Mechanical Engineers. Transactions, 1858, etc. Midland Institute.

—— North East Coast Institution of Engineers and Shipbuilders. Transactions, 1885, etc. North East Coast Institute.

—— North of England Institute of Mining and Mechanical Engineers. Transactions, 1854, etc. North of England Institute.

—— North of England Institution of Colliery Engineers. Transactions, 1876–78. North of England Institution.

—— North Staffordshire Institute of Mining and Mechanical Engineers. Transactions, 1874, etc. North Staffordshire Inst.

Oxford. Society for Promoting the Study of Gothic Architecture. Architectural Antiquities of Oxford. Society for Promoting the Study, etc., 1846.

Plymouth Institution. Plymouth I., 1830

Redruth. Mining Institute of Cornwall. Proceedings, 1877–84. Mining Institute.

Sheffield. British Society of Mining Students. British Society.

Sunderland. British Shipmasters' and Officers' Protection Society. British Shipmasters, 1883.

West of England. South-West of England District Association of Gas Managers. Proceedings of half-yearly meetings, 1880–92. South-West of England District Assoc., etc.,

Woolwich. Royal Artillery Institution. Proceedings, Papers and Catalogue of library. Royal Artillery Inst., 1858, 1860, 1873 and 1883.

SOCIETIES (Colonial).

Adelaide Philosophical Society. Adelaide, 1877–80.

—— Royal Society of South Australasia. Transactions and Proceedings, 1878–86. Royal Soc. of S. Australasia.

SOCIETIES (COLONIAL)—*continued.*

Adelaide. South Australian Association of Architects, Engineers, and Surveyors. Rules. SOUTH Australian Assoc., 1858.

Brisbane. Royal Geographical Society of Australasia. Proceedings of the Queensland and South Australian Branch. ROYAL Geographical Soc. of Australasia, 1886–87.

—— Royal Society of Queensland. Proceedings, 1884–89. ROYAL Soc. of Queensland.

Bombay. Sassoon Mechanics' Institute, Bombay. Reports, 1870–85, Rules and Catalogue of Library, 1874. Lectures. SASSOON Mechanics' Inst.

Calcutta. Asiatic Society of Bengal. ASIATIC Soc. of Bengal.

Cape Town. South African Philosophical Society. Transactions. SOUTH African Philos. Soc., 1878–88.

Demerara. British Guiana Royal Agricultural and Commercial Society. BRITISH Guiana, 1882–90.

Halifax. Nova Scotian Institute of Natural Science. Proceedings and Transactions, 1889, etc. NOVA SCOTIAN.

Johannesburg. South African Association of Engineers and Architects. Proceedings and Bye-Laws. SOUTH African Assoc., etc., 1893.

Melbourne. Royal Society of Victoria. Transactions, Proceedings, and President's address, 1855, etc. ROYAL Soc. of Victoria.

—— Victorian Engineers' Association. Transactions and Proceedings. VICTORIAN Engineers' Assoc., 1886.

—— Victorian Institute of Engineers. Rules for Electrical Installations. VICTORIAN Inst. of Engineers, 1889.

—— Victorian Institute of Surveyors. Transactions and Proceedings. VICTORIAN Inst. of Surveyors, 1881, etc.

Montreal. Canadian Society of Civil Engineers. CANADIAN Society.

Quebec. Royal Society of Canada. Papers. BAILLAIRGÉ, 1884.

Sydney. Engineering Association of New South Wales. Minutes, Proceedings, etc., Catalogue of Conversazione. SYDNEY, 1883, etc., p. 274.

—— Royal Society of New South Wales. Transactions, Rules, List of Members, and Catalogue, 1874, etc. ROYAL Soc. of N.S. Wales.

—— Sydney Institution of Surveyors. The Surveyor, Journal of the Inst. SYDNEY, 1888, etc., p. 274.

Tasmania. Royal Society of Van Diemen's Land. Papers and Proceedings, 1851–53. ROY. Soc. of Van Diemen's Land, 1851–53.

Toronto. Canadian Institute. CANADIAN Inst. Canadian Journal. PERIODICAL PUBLICATIONS, p. 13.

Wellington. New Zealand Institute. Transactions, 1869, etc. NEW ZEALAND, p. 413.

SOCIETIES (FOREIGN).

Albany Institute. Manual. PRATT (D. J.), 1870.

Amsterdam. Koninklijke Akademie van Wetenschappen, 1863–65. KONINKLIJKE Akad.

Antwerp. Société commerciale, industrielle, etc. Anvers, 1877–79. ANTWERP.

Baltimore. Peabody Institute. PEABODY, 1869.

Barcelona. Asociación de Ingeneiros Industriales. BARCELONA, 1891. Revista tecnologico industriale. PERIODICAL PUBLICATIONS, p. 23.

Berlin. Akademie der Wissenschaften, Berlin. AKADEMIE d. W., 1877.

—— Architekten-Verein zu Berlin. ARCHITEKTEN Verein.

—— Association Géodésique Internationale. ASSOCIATION Géodésique.

—— Deutscher Architekten- und Ingenieur-Verein. Conference, 1880. DEUTSCHER.

—— Deutsch-Österreichischen Telegraphen-Verein. Zeitschrift. DEUTSCH.-Österr., 1854–69.

—— Deutscher Verein zur Förderung der Luftschiffahrt. Zeitschrift. DEUTSCHER, 1886, 1899.

—— Königliche Bau-Akademie. BERLIN, 1867.

—— Königliche Gewerbe Akademie. BERLIN, 1866.

—— Königliche technische Versuchsanstalten. BERLIN, 1892.

—— Verein für Eisenbahnkunde. BERLIN, 1892.

—— Königliche Gewerbe Institut. BERLIN, 1860.

—— Verein deutscher Ingenieure. Wochenschrift. Zeitschrift. VEREIN Deutscher Ingenieure.

—— Verein deutscher Portland Cement-Fabrikanten. VEREIN Deutscher P.C.F.

—— Verein für Gesundheits-Technik. VEREIN für G. T.

—— Verein zur Beförderung des Gewerbfleisses. VEREIN zur B. des G.

Bethlehem. Lehigh Engineering Society. Journal, 1885–89. LEHIGH University, U.S.A.

Bologna. Circolo tecnico, Bologna. BOLOGNA, 1877.

Boston, U.S. American Academy of Arts and Sciences. AMERICAN Academy

—— National Association of Builders of the United States. Report, 1887, etc. NATIONAL Assoc.

—— Boston Society of Civil Engineers. BOSTON, 1888.

Brussels. Académie Royale de Belgique. Annuaires, Bulletins, Catalogue, Mémoires. ACADÉMIE Royale, 1777, etc.

—— Brussels Geographical Institute. DRAPIEZ, 1842.

—— Military Cartographic Institute. BRUSSELS, 1855.

SOCIETIES (FOREIGN)—*continued.*

Brussels. Museum of Industry. BRUSSELS, 1841–83.

—— Société Scientifique. BRUSSELS, 1877–88.

—— Towing company. Communications.
SOCIÉTÉ Centrale de Touage, 1869.

Budapest. Hungarian Society of Engineers, 1867, etc. HUNGARIAN.

Buenos Ayres. Sociedad Cientifica Argentina. Anales.
SOCIEDAD Cientifica, etc., 1876.

Carlsruhe. Centralbureau für Meteorologie und Hydrographie.
BADEN, 1884.

Cherbourg. Société des Sciences Naturelles.
CHERBOURG, 1852, etc.

Chicago. American Electrical Society. AMERICAN Electrical S.

—— American Institute of Architects.
AMERICAN Inst. of Arch.

—— Civil Engineers' Club of the North-West. Papers.
CIVIL Engineers.

—— Western Society of Engineers. Proceedings.
WESTERN Society of Engineers, 1880, 1892.

Cincinnati. American Railway Master Mechanics' Association.
AMERICAN R.M.M. Assoc.

—— Ohio Mechanics' Institute. Proceedings, 1883.
OHIO MECHANICS.

Cleveland. Civil Engineers' Convention.
CLEVELAND, Ohio, 1885.

—— Engineering Societies. CLEVELAND, Ohio, 1886.

Cologne. Architekten- und Ingenieur-Verein für Niederrhein und Westfalen. ARCHITEKTEN u. I.V.

Denver. Society of Civil Engineers and Architects.
DENVER, 1890.

Dresden. Sächsischer Ingenieur- und Architekten-Verein. History. Bylaws. List of Members. Yearbook. Proceedings. Minutes and Catalogue, 1856–86.
SÄCHSISCHER Ingenieur- u. Architekten-Verein.

Elberfeld. Deutsch-Amerikanischer Bergwerk-Verein.
ELBERFELD, 1827.

Florence. Collegio degli Architetti ed Ingegneri.
FLORENCE, 1877, etc.

—— Istitutioni di Architettura, statica, e idraulica.
SAN BERTOLO (N.C.), 1832–33.

Freiberg in Sachsen. Rheinischer-Westfälischer Marscheider-Verein. Mittheilungen. RHEINISCH-Westfälischer M.V.

Genoa. Societa degli Architetti Ingegneri Civili di Genova Atti, 1877–79. GENOA.

Ghent. Association des Ingénieurs de Gand. Annales, Bulletins.
GHENT, 1877, etc.

SOCIETIES (FOREIGN)—*continued.*

Gothenburg. Chalmers Tekniska Läroanstalt. Program. GOTHENBURG, 1890.

Hague (The). Koninklijk Instituut van Ingenieurs. Charter, List of members, publications, etc. 1847, etc. KONINKLIJK Instituut.

Halle. Allgemeine deutsche Bergmannstag in Halle. Festbericht und Verhandlungen, 1889. HALLE.

Hanover. Architekten- und Ingenieur-Verein zu Hannover. ARCHITEKTEN u. I.V.

—— Verein für Hebung der Fluss- und Canal-Schifl-fahrt. VEREIN für Hebung.

Hoboken, N.J. Stevens Institute of Technology. THURSTON, 1874. Annual Announcements. Exterior and Interior Views. STEVENS Institute of Technology, 1872–89.

Indianopolis. Indiana Association of County Surveyors and Civil Engineers. Proceedings, 1881–86. INDIANA.

—— Indiana Society of Civil Engineers and Surveyors. Proceedings, 1887, '88. INDIANA. Add. 510.

Jacksonville. Southern Society of Civil Engineers. Proceedings, 1887. SOUTHERN Soc. of Civil Engineers.

Kansas City. Engineers' Club. Transactions. KANSAS City. Add. 513.

Lausanne. Société Vaudoise des Ingénieurs et des Architectes. Bulletin. SOCIÉTÉ Vaudoise des Ingénieurs, 1876, etc.

Liége. Association des Ingénieurs. Annuaire, Bulletin, etc. LIÉGE, 1851, etc.

—— Institut Electro-Technique Montefiore. Programmes. LIÉGE, 1886, etc.

—— Iron and Steel Institute, Liége, 1881. KOCH (F.).

—— Société Géologique de Belgique. Annales. SOCIÉTÉ Géologique de Belgique, 1874–87.

Lille. Association des Propriétaires d'Appareils à Vapeur du Nord de la France. ASSOCIATION, 1874.

—— Société Industrielle du Nord de la France. Bulletin. SOCIÉTÉ Industrielle du Nord, etc., 1873–80.

Lisbon. Associação dos Engenheiros Civis Portuguezes. ASSOCIAÇÃO, 1870.

Little Rock. Arkansas Society of Engineers, Architects, and Surveyors. ARKANSAS Soc. of E., A. and S.

Lüneburg. Naturwissenschaftlicher Verein. Jahreshefte, 1878. LÜNEBURG.

Madrid. Sociedad de los Ferrocarriles. MADRID, 1887, p. 307.

—— Sociedad Geográfica. MADRID, 1876, p. 307

Marseilles. Société Scientifique Industrielle. Bulletin. MARSEILLES, 1872, etc.

SOCIETIES (FOREIGN)—*continued.*

Milan. Collegio degli Ingegneri ed Architetti. Atti, 1868, etc.
MILAN.

—— Congress of Engineers and Architects. Publications, 1873.
MILAN.

—— Reale Istituto Lombardo di Scienze, Lettere ed Arti. Atti, Giornale, Memorie, Rendiconti. REALE Istituto.

Mülhausen. Association pour prévenir les accidents de Machines.
ASSOCIATION pour p. les acc.

—— Gesellschaft zur Verhütung von Fabrikunfällen.
MÜLHAUSEN, 1889.

—— Société Industrielle. Bulletin, Programme, etc.
MÜLHAUSEN, 1836, etc.

Munich. Akademie der Wissenschaften, München.
AKADEMIE d. W., 1832, 1878.

—— Bayerischer Architekten- und Ingenieur-Verein.
BAYERISCHER, 1874–77.

Naples. Collegio degl' Ingegneri ed Architetti. Atti 1876–83.
NAPLES.

—— Reale Istituto d' incorraggiamento alle scienze naturali. Atti, 1811–34, 1893. NAPLES; REALE Istituto.

New York. American Gaslight Association.
AMERICAN Gaslight.

—— American Institute. AMERICAN Institute.

—— American Institute of Electrical Engineers.
AMERICAN Institute of El. Eng.

—— American Philosophical Society. AMERICAN Phil. Soc.

—— American Society of Civil Engineers. AMERICAN Soc. of C.E. International Engineering Congress, Chicago. Papers. AMERICAN Society of Civil Engineers, 1823. Add. 480.

—— American Society of Mechanical Engineers.
AMERICAN Soc. of M.E.

—— Association of Engineering Societies.
ASSOCIATION OF E. Soc. (1884–1891).

—— Cooper Union. Reports, 1861–91. COOPER Union.

—— Library Journal. Official organ of the American Library Association. PERIODICAL PUBLICATIONS, p. 18.

—— New York Agricultural Society. Transactions, 1845.
NEW YORK Agric. Soc.

—— United States Military Service Institution. Journal. PERIODICAL PUBLICATIONS, p. 18. UNITED States Military Service Inst., 1888, etc.

—— United States Naval Institute. Papers and proceedings.
UNITED States Naval Inst., 1875.

Palermo. Collegio degl' Ingegneri et Architetti. Atti, 1879 etc.
PALERMO.

SOCIETIES (FOREIGN)—*continued.*

Paris. Académie des Sciences. ACADÉMIE des Sciences. Analysis of the Works. DELAMBRE, 1819; FOURIER, 1828. History and memoirs. MARTYN and Chambers, 1742.

—— Association Alsacienne des Propriétaires d'Appareils à Vapeur, 1869. ASSOCIATION Alsacienne.

—— Association Amicale. ASSOCIATION Amicale.

—— Association Française pour l'avancement des sciences. ASSOCIATION Française.

—— —— 1885–86. COLLIGNON (E.), 1886.

—— Association Parisienne des Propriétaires d'Appareils à Vapeur. Bulletin, 1875–76. ASSOCIATION Parisienne.

—— Association des Propriétaires d'Appareils à Vapeur, Paris. Compte-rendu, 1884. ASSOCIATION, p. 69.

—— Association Scientifique de France. ASSOCIATION Scientifique.

—— Indo-Chinese Society. LEGRAND, 1878.

—— Institut (l') de France. Rules, etc. AUCOC (1889).

—— Société d'Encouragement pour l'Industrie Nationale. Bulletins, 1802–1818. Index. LA CHABEAUSSIÈRE (A. J. M. P. de), 1820. App. 565. SOCIÉTÉ d'Encouragement, etc., 1809–18, 1874–85, 1886, etc.

—— Société d'Études du Nil. SOCIÉTÉ d'Études du Nil, 1889.

—— Société Française des Habitations à bon Marché. Bulletin. SOCIÉTÉ Française des Habitations, etc., 1890.

—— Société Géologique de France. Mémoires. SOCIÉTÉ Géologique de France, 1835–42.

—— Société des Ingénieurs Civils. Proceedings, etc. Memoirs and Proceedings. Statutes, Road Making. Recruiting for the Corps des ponts et chaussées. SOCIÉTÉ des Ingénieurs Civils, 1848, etc.

—— Société Internationale des Électriciens. Bulletin. SOCIÉTÉ Internationale des Électriciens, 1886, etc.

—— Société Technique de l'Industrie du Gaz en France. Comptes-rendus. SOCIÉTÉ Technique de l'Industrie, etc., 1874.

Philadelphia. American Association for the Advancement of Science. AMERICAN Association.

—— American Institute of Mining Engineers. AMERICAN Inst. of M.E.

—— American Iron and Steel Association. AMERICAN I. and S. Assoc.

—— Engineers' Club Papers. PHILADELPHIA, 1878, p. 33.

—— Franklin Institute. Journal. Reports, Catalogues, etc. FRANKLIN Institute, 1828–99.

Pittsburgh. Engineers' Society of Western Pennsylvania. ENGINEERS' Society.

SOCIETIES (FOREIGN)—*continued.*

Pittsburgh. Iron and Steel Institute. Visit to Pittsburgh. PITTSBURGH, 1890.

Prague. Architekten und- Ingenieur-Verein in Böhmen. ARCHITEKTEN u. I.V.

—— Deutscher Polytechnischer Verein in Böhmen. Vierteljahrschrift. DEUTSCHER, 1869, etc., p. 341.

—— Königlich-böhmisches polytechnisches Land-Institut. PRAGUE, 1863.

—— Polytechnisches Institut des Königreiches Böhmen. PRAGUE, 1866–67.

Rio de Janeiro. Instituto Polytechnico Brazileiro. Revista. 1868, etc. INSTITUTO.

—— Sociedade de Geographia do Rio de Janeiro. RIO de Janeiro, 1885 and 1886–7.

Rome. Accademia dei Lincei. ACCADEMIA Pontificia de Nuovi Lincei.

Rotterdam. Bataafsch Genootschap der proefondervinlijke Wijsbegeerte. BATAAFSCH G. (1844–51).

—— Société Batave de Philosophie Expérimentale. Programme. SOCIÉTÉ Batave, etc., 1882, '84, '90.

—— Société de Commerce de Rotterdam. ROTTERDAM, 1858.

Rouen. Société Industrielle. Bulletin. ROUEN, 1873.

St. Etienne. Société de l'Industrie Minérale. Bulletin and Atlas of plates. SOCIÉTÉ de l'Industrie Minérale, 1855–70, 1872–86, 1887, etc.

St. Petersburg. Academia Imperalis Petropolitana. Commentarii. ST. PETERSBURG, 1844–51.

St. Quentin. Société Industrielle de St. Quentin et de l'Aisne. Bulletin. SAINT Quentin, 1869–85.

San Francisco. Mechanics' Institute. Reports. SAN FRANCISCO, 1891.

—— Technical Society of the Pacific Coast. Transactions. TECHNICAL Soc. of the Pacific Coast, 1884.

Springfield. Illinois Mining Institute. Journal. ILLINOIS, 1893.

Stockholm. Ingeniörs Förening. STOCKHOLM, 1866–90.

Stuttgart. Deutscher Geometer-Verein. Zeitschrift. DEUTSCHER, 1872, etc., p. 340.

Topeka. Kansas State Historical Society. Report, 1887–88. KANSAS.

Toronto. Association of Provincial Land Surveyors. Proceedings, 1886. ONTARIO.

—— Engineering Society of the School of Practical Science. Journal. TORONTO, 1888, etc.

Trieste. Società d'Ingegneri ed Architetti di Trieste. Atti, vol. 8. TRIESTE, 1885.

SOCIETIES (FOREIGN)—*continued.*

Troy, N.Y. Rensselaer Society of Engineers. Papers.
RENSSELAER Soc. of Engineers, 1884–89.

Turin. Società degli Ingegneri e degli Architetti. Atti, Catalogue of Library. TURIN, 1869–93.

Venice. Reale Istituto Veneto. Atti, 1880, &c. REALE Istituto.

Vienna. Akademie der Wissenschaften, Wien.
AKADEMIE d. W., 1877, 1884.

—— Oesterreichischer Ingenieur- und Architekten-Verein. Publications, 1849, etc. Statutes, 1872. Library Catalogue, 1871.
OESTERREICHISCHER Ing.- u. Arch.-Verein.

Washington. American Association of State Weather Services.
AMERICAN Association, p. 32..

—— American Society of Naval Engineers.
AMERICAN Soc. of N.E.

—— Association of Official Agricultural Chemists.
ASSOCIATION of Official Agric. Chem. (1890).

—— National Institution for the promotion of Science established at Washington. POINSETT, 1841.

—— Smithsonian Institution. Reports, 1850, etc. Contributions to Knowledge, 1848, etc. Miscellaneous Collections, 1862, etc. List of Foreign Correspondence, 1882. Financial Condition, etc., 1849. SMITHSONIAN Inst.

—— National Academy of Sciences. Reports. HENRY (Joseph), 1867–68 ; UNITED STATES, 1867–8. Add. 537.

Wiesbaden. Verein deutscher Eisenbahn-Verwaltungen.
VEREIN deutscher E.V.

Wurtemberg. Württemb. Verein für Baukunde.
WURTEMBERG, p. 467.

Yokohama. Seismological Society of Japan. Transactions, 1880–92. SEISMOLOGICAL Soc.

Zurich. Schweizerischer Ingenieur- und Architekten-Verein. Mittheilungen.
SCHWEIZERISCHER Ingenieur- u. Architekten-Verein, 1876–81.

SOCIOLOGY.

Material and moral position of the populations of Europe and America. CUNNINGHAM (D.), 1878.

Review of Quetelet, Du système social. LOVELACE, 1850.

SODA-MANUFACTURE. Extraction from Sea-Salt.
ANONYMOUS, 1794, p. 43.

History. GOSSAGE, 1861.

SOIL.

Easy way of ascertaining its capabilities.
ROBINSON (John), M.B., 1863.

Relations of Soil to Climate. HILGARD, 1892.

Spontaneous slipping of clayey soils. COLLIN (A.), 1846.

SOLIDS. Laws of the molecular equilibrium of solids.
REBOUÇAS, 1880.

SORGHUM.
Source of sugar, syrup, and fodder. Culture and manufacture.
COLLIER (P.), 1884.
Sorghum and its products. STEWART (F. L.), 1867.

SOUND. BURDACH and Reisig, 1767; EVERETT, 1882.
Acoustics of Public Buildings. SMITH (Thomas R.), 1861.
Application of Acoustics to the construction of Buildings.
BARRETT (W. F.), 1869.
Communication of Sound. REID (D. B.), 1844.
Experiments respecting Sound. YOUNG (Dr. T.), 1800.
Identity of the agents which produce sound, heat, light, electricity.
LOVE (G. H.), 1861.
Laplace's theory of Sound. RANKINE (W. J. M.), 1851.
Lectures. TYNDALL (J.), 1869, '75, '83, p. 335.
Nature of Sound. WÜNSCH (C. E.), 1776.
Newton's doctrine. HALES (W.), 1778.
Observations on Sound. MATTHEWS (H.), 1826.
Problem of Sound. AIRY (Sir G. B.), 1849, p. 18.
Production and transmission of Sound in Water.
COLLADON, 1841; COLLADON and Sturm, 1887.
Range of Sound in the Air. ALLARD (E.), 1882.
Signals, Character of. ALLARD (E.), 1882.
Signals at Lighthouses. ALLARD (E.), 1881.
Sound anatomized; an essay on Music. TURNER (W.), 1724.
Swiftness of sound propagated through the elastic fluid.
ROYAARDS, 1819.
Tartini's Beats. Mathematical Theory.
HOPKINSON (Dr. John), 1872, p. 73.
Theory. RAYLEIGH, 1878.
Velocity of Sound, Challis's theoretical determination of.
AIRY (Sir G. B.), 1848, p. 23.
—— in liquid and solid bodies of limited dimensions.
RANKINE (W. J. M.), 1850.
Vibrations. AIRY (Sir G. B.), 1868, p. 19.
See also ACOUSTICS.

SOUNDING LOG. Description, and reports of Captains.
PÉCOUL (A.), 1855.

SOUNDINGS (DEEP SEA).
Atlantic, North Ocean, between Ireland and Newfoundland in H.M.S. "Cyclops," 1857. DAYMAN.
Bathometer. SIEMENS (Sir W.), 1879.

SOUNDINGS (Deep Sea)—*continued.*

Guide to the Sounder or treatise on Soundings.
Degousée and Laurent, 1861.

New portable apparatus. Broeck and Rutot, 1888.

Self-registering sounding apparatus. Stecher [1883].

Sounding Lead. Researches on its origin or invention.
Thury (Viscount H.), 1829.

Soundings in Shallow Water. Wilson-Barker (D.), 1891.

Thomson's Patent Sounding Machine, Instructions for the use of.
White (J.), 1892.

U.S.A. Deep Sea Soundings. United States, p. 345.

SPECIES. Primary cause of the succession of new species.
Anonymous, 1862, p. 43.

SPECIFIC GRAVITY.

Apparatus for the rapid determination of specific gravities of bodies. Brown (M. W.), 1887.

Specific gravities and the strengths and values of Spirituous Liquors. Atkins and Co., 1803.

Specific gravity for solids and liquids. Clarke (F. W.), 1888.

SPECIFICATIONS. Handbook of, guide to the Architect, engineer, surveyor and builder. Donaldson (T. L.), 1859.

Specifications, rates and notes on work.
Marryat, 1877, 1883, 1887.

SPECTACLES.

Essay on Spectacles. Martin (B.), 1756. App. 567.

Rules to find what Spectacles suit the sight.
Kitchiner (W.), 1818, '24. App. 564.

SPECTRUM ANALYSIS.

Letters. Roscoe (Sir H. E.), 1869.

Madeira Spectroscopic; being a revision of twenty-one places in the red half of the Solar visible Spectrum, with a Rutherford Diffraction Grating at Madeira. Smyth (C. P.), 1882.

Magnetising Power of the more refrangible Solar Rays.
Somerville (Mrs. Mary), 1826.

Micrometrical Measures of Gaseous Spectra under High dispersion
Smyth (C. P.), 1886.

Terrestrial substances, application to, and the physical constitution of the heavenly bodies. Schellen (H.), 1872, 1885.

Visual Solar Spectrum in 1884. Smyth (C. P.), 1886.

SPECTROSCOPE.

Lectures. Abney, 1885.

Practical Use. Parry (J.), 1888.

SPEED.

Measurement with common instruments. EREDE, 1875.
Speed Measurement. CAVANI, 1883.
Speed Regulators. MARIÉ, 1887.

SPHERE.

Gnomic projection. ANONYMOUS, 1851, p. 51.
New projection. ANONYMOUS, 1860, p. 50.
Resistance of the Atmosphere to an Oscillating Sphere. AIRY (Sir G. B.), 1841, p. 23.
Spherics. THEODOSIUS, 1707.

SPHEROIDS. Laplace's investigation of the attraction of, differing little from a sphere. AIRY (SIR G. B.), 1826, p. 19.

SPINNING MACHINES. BODMER (J. G.), 1838.

SPIRITUOUS LIQUORS. Assaying, weighing, measuring and valuing. GUTTERIDGE, 1828.

SPIRITUALISM. Investigation. PENNSYLVANIA University (1887). Report of the Commission appointed by the University of Pennsylvania. SEYBERT (H.), 1887.

SPONTANEOUS GENERATION. Attempt to produce living creatures in Vacuo Boyliano. ANONYMOUS, 1704, p. 49.

SPRINGS. Tapping and closing the Spring of hot water at Mr. Pinch's brewery, Bath. ARMSTRONG (W.), 1838.
Rome. PARASACCHI, 1637.

SQUIRRELS. Synonymatic List of the American Sciuri or Squirrels. ALLEN (J. A.), 1878.

STABLES. Paving and drainage. PYE-SMITH, 1882.

STAGE COACHES. Bill to repeal certain parts of four Acts of Parliament, 1810. IRELAND, p. 143.
—— Bills for limiting the number of persons to be carried on the outside, 1809–10. PARLIAMENTARY..Papers, p. 515.
Church's (Dr.) London and Birmingham coach, built, 1833. CHURCH (Dr.).
Construction. PARNELL (Sir H. B.), 1835.
Danger of Travelling in Stage Coaches, and a remedy proposed. MILTON (Rev. W.), 1810. App. 568.
History. THRUPP (G. A.), 1877.
Observations on Stage Coaches and Stage Waggons. DEACON (W.), 1807. App. 553.

STARCH MANUFACTURE. DUBIEF, 1883.

STATICS. Earnshaw, 1845; Eytelwein, 1808; Herbart, 1822; Leupold, 1726; Poinsot, 1824; Application to Geometry. Collignon (E.), 1873.
Principles and practice. Baker (T.), 1851.
Theorem. Spottiswoode (W.), 1857.
Theory of Couples. Pritchard, 1831.
Treatise. Minchin, 1877, '84–'86.

STATICS (Graphic). Bauschinger, 1871; Clarke (G. S.), 1880; Cremona, 1890; Culmann, 1866, '75; Eddy, 1878; Favaro, 1873, 1877; Lévy, 1886–88; Graham (R. H.), 1883; Ott, 1876; Ritter (W.), 1883, '86, '88–'90; Rouché (E.), 1889; Saviotti, 1888; Williot, 1877.
Analytical Statics. Whewell (W.), 1833.
—— Treatise on. Todhunter (I.), 1866, p. 316.
Application to framed structures. Du Bois, 1883.
Applications. Koechlin, 1889; Willett (J. R.), 1888.
Applied to the balance of articulated systems. Thiré (A.), 1891.
Applied to constructions. Müller-Breslau and Seyrig, 1886.

STATISTICS.
Clearing House during the year 1839. Babbage, C., 1856.
Dictionary. Mulhall, 1884.
Facts and Figures. Periodical Publications, p. 15.
Graphic representation. Vauthier, 1890.
International Congress. Quetelet, 1863, 1873.
Statistical Companion to the Pocket Book, 1844. Weld.
Statistical Returns for the promotion of preventive as well as of curative science. Chadwick (Sir E.), 1870, p. 234.

Australasia. Statistics, 1877–78, Victoria, p. 37; 1889, Australia.
—— Seven Colonies. Coghlan (T.A.), 1890, '93.
Belgium. Heuschling, 1841.
—— Age of married persons, 1841–65. Quetelet, p. 75.
Buenos Ayres. Statistical annual, 1882. Buenos Ayres.
Cape Colony. Blore, 1871; Cape Colony, p. 220.
England, Scotland and Ireland, Statistical Atlas. Bevan (G. P.), 1882.
France. France, pp. 439–40.
Ireland. Statistics of, 1852 and 1853. Thom (A.)
Italy. Italy, p. 148.
Lancashire. Statistical Illustrations of past and present state. Lancaster, 1840.
Manchester and Salford. Social and Educational Statistics. Chadwick (D.), 1862.

STATISTICS—*continued.*

New South Wales. COGHLAN (T. A.), 1887.

—— Statistical Register, 1871, &c. NEW SOUTH WALES, p. 404.

Saxony. SAXONY, 1873.

Spain. SPAIN, p. 235.

United Kingdom. Miscellaneous Statistics, 1857–83. PARLIAMENTARY..Papers, p. 515.

—— Tables of the Revenue, Population, Commerce, &c., of the U. K. and its dependencies, 1833–53. PARLIAMENTARY..Papers, p. 516.

United States. EVANS (W. W.), 1885.

—— Scribners' Statistical Atlas. HEWES and Gannett, 1885.

Victoria Statistical notes, 1835–60. ARCHER, W. H.

—— Statistical register. ARCHER, W. H., 1854; 1876, etc., and Tables, 1872. VICTORIA, p. 378.

STATISTICS (VITAL).

Duration of Life. CHADWICK (SIR E.), 1885, p. 234.

Brisbane Report. BRISBANE, 1884.

Bristol, probabilities and expectations of life. RANKIN (R.), 1830.

London, Bills of Mortality. GRAUNT (J.), 1676.

New South Wales. Vital Statistics, 1874–75. NEW SOUTH WALES, p. 404.

Southampton, 1891. SOUTHAMPTON.

United States. Mortality and Vital Statistics. BILLINGS (J. S.), 1885.

See also BIRTHS, Deaths, and Marriages.

STATURE. Statistics of Human height. QUETELET, 1868, p. 75.

STATUTES.

Consolidation Acts of 1845 and 1847. TAYLER (G.), 1857.

Handbook for the use of Solicitor and Engineers engaged in promoting Private Acts of Parliament and Provisional Orders. MACASSEY, 1887.

Index to Statutes in force to 1892. PARLIAMENTARY..Papers, p. 516.

Report from the Committee on temporary laws, 1796. PARLIAMENTARY..Papers, p. 516.

Reports on the promulgation of the Statutes, 1796, 1801. PARLIAMENTARY..Papers, p. 516.

STEAM. BALE, 1884. Article for the Encyclopædia Britannica. ROBISON (J.), 1818.

Characteristic equation of steam. ANTOINE, 1892.

Condensation of steam. BURGH (N. P.), 1871.

Condensation of Steam in Single and Compound Cylinders. MARKS (W. D.), 1884.

STEAM—*continued.*

Density of Steam. RANKINE (W. J. M.), 1862.

Dryness of Steam. Method of determining. Report. BRITISH Association, 1894. Add. 487.

Economy in its use. SALTER (F.), 1874.

Economy of fuel by the use of Steam in the patent process of Ivison. FYFE, 1842.

Economic production of steam. BUCHETTI, 1884; PARKES (J.), 1822.

Elementary treatise on Steam. PERRY (Prof. J.), 1874, p. 29.

—— Use of the Indicator. GRAHAM (J. C.), 1877.

Equation between the Temperature and the maximum elasticity of Steam and other Vapours. RANKINE (W. J. M.), 1849.

Expansion of Steam, Limitations of. MARKS (W. D.), 1887.

Handbook for Steam users. BALE, 1887, 1890.

Heat, total. ANTOINE (C.), 1892.

Heat, Latent, of steam and absolute Zero. DONALDSON (W.), 1894. Add. 497.

High pressure steam and its use for Compound Engines. ROWAN (F. J.), 1880.

—— Application to quadruple engines. ADAMSON (D.), 1875.

Modern Steam Practice and Engineering. WINTON (J. G.) and Miller, 1883.

Most advantageous use of Steam. GORDON (L. D. B.), 1845.

Nature and Application. ALDERSON, 1834; RUSSELL (John S.). 1841.

Overheating of Steam. WALTHER-MEUNIER (H.), 1891.

Power of Steam. COLDING, 1851.

Power (Steam) Cost. EMERY (C. E.), 1893.

—— Expositions and Illustrations. MACERONE, 1835.

—— Index to Parliamentary Reports, 1817–34. PARLIAMENTARY..Papers, p. 516.

Practical Notes. KING (W. H.), 1870.

Pressure and Density. POLE, 1849.

Production of Steam, Note on the. PÉRISSÉ, 1892.

Properties. BOULVIN, 1893; FAIRBAIRN (Sir W.), 1860, p. 403.

Reactive Influence of Steam. MILLAR (W. J.), 1885.

Saturated Steam. ANONYMOUS, 1886, p. 60. Tables of Temperatures and Pressures of Saturated Steam. PEACOCK (R. A.), 1874.

—— Motive power in Volcanoes and Earthquakes. PEACOCK (R. A.), 1882.

Study on Steam. SAXBY (S. M.), 1862.

Superheated Steam, new application. MARTIN (E.), 1865.

—— In stationary engines and locomotives. RAFFARD, 1892.

STEAM—*continued.*

Temperature, Changes of, consequent upon any change in the density of Elastic Fluids considered especially with reference to Steam. WEBSTER (Thomas), Q.C., 1852.

Text Book. JAMIESON (Andrew), 1886, '92

Theory. Energy and Entropy. DYER (H.), 1885.

Treatise on Steam. WARD (James H.), 1860

STEAM BOILERS (GENERAL REFERENCES). HIRSCH (J.), 1890. MARSEILLES, 1880; REICHE (H. von), 1881; ROSE, 1888; SCHWACKHÖFER (F.), 1884; WITZ (A.), 1892.

Accidents and their prevention. MORISON (D. P.), 1879.

Action of heat on the walls. MAUPEOU, 1889.

Admiralty. Evidence on the causes of deterioration of boilers, 1877. PARLIAMENTARY.. Papers, p. 467.

American Institute Exhibition of '71. Report of the Committee appointed to test. THURSTON (R. H.), 1872, p. 310.

Application of general principles to the construction of Steam generators. TROWBRIDGE (W. P.), 1874.

Boiler making. BURGH (N. P.), 1873.

Boilermakers' Assistant. COURTNEY, 1880.

Boilermakers' Ready Reckoner. COURTNEY, 1885.

Boilermakers' and Iron Shipbuilders' Companion. FODEN, 1869.

Boilermakers' pocket book. SEXTON (M. J.), 1882.

Care and Management. ROPER (S.), 1885.

Circulation of Water in. BOLTON (R.), 1891; SAUVAGE (E.), 1892.

Collapse of boiler flues. FAIRBAIRN (Sir W.), 1860, p. 403.

Construction. FAIRBAIRN (Sir W.), 1851, p. 403; FOLEY, 1881, '91; HUTTON (W. S.), 1891; SMYTH (S. R.), 1861.

Construction of fire chambers. DIMOND, 1867.

Construction and Management of Steam-Boilers. ARMSTRONG, R., 1866.

Construction and proper proportion of Boilers for the Generation of Steam. MURRAY (Andrew), 1844.

Construction, setting and management. BURWELL (L. C.), 1884.

Construction and strength. TRAILL (T. W.), 1888.

Construction and strength of the cylindrical parts. HOLT (A.), 1873.

Cylindrical and waggon head boilers. Relative power and effect produced by. WICKSTEED (I.), 1842.

Density, calculation of the. SINIGAGLIA (F.), 1893.

Design, construction and management. SHOCK (W. H.), 1880.

Dynamical law of Horse Power. NYSTROM, 1875

Engineering, Boiler. Modern practice. ARMSTRONG (R.), 1856.

STEAM BOILERS (General References)—*continued.*

Essay on Boilers of Steam Engines. Armstrong (R.), 1839; Harrison (Joseph), jun., 1867.

Failure of Steam for Boilers. Maginnis, 1892.

Forced Draught. Fothergill (J. R.), 1886, '88.

Furnaces, Improvements in. Baker (H. F.), 1848.

Generators, Steam. Boutigny, 1830. Note on some safety apparatus. Watteyne (V.) and Demeure, 1890.

High Pressure. Practical treatise. Barr (W. M.), 1880.

Modern Lancashire Boilers, Construction of. Boswell (S.), 1891; Fletcher (L. E.), 1876; Specification for a Lancashire Boiler, 7 feet 6 inches. Fowler (W. H.), 1888.

Making, Steam, or, Boiler practice. Smith (Chas. A.), 1885.

Management on land and sea. Peattie (J.), 1888.

Manual of design, construction, and operation. Thurston (R. H.), 1888, p. 309.

Multitubular generators. Maupeou, 1889.

New Boilers at the Paris Exhibition of 1878. Beretta and Desnos, 1881.

Non-Condensing Boilers. Tables and diagrams relating to. Trowbridge (W. P.), 1872.

Patents for improvements in Steam Boilers. Harrison (Joseph), jun., 1867.

Pipe boilers *v.* shell boilers for naval service. Isherwood, 1890.

Removal, frequent, of steam boilers in our Ironclad fleet. Bailey (James), 1874.

Specification of improved patent Steam Boilers. Collier, 1837.

Steam Boiler Assurance Company. Engineer's Reports. Steam Boiler, etc., 1873–81

Steam-Jacket, Authorities on. Thurston (R. H.), 1871, p. 308.

Strength and construction of. Cruickshank, 1882.

Theory and Practice. Poillon, 1877.

Treating. Rose (J.), 1888; Wilson (Robert), 1875.

Triple expansion. Kullmann and Co. Weber (A.), 1894.

United States. Report on Experiments in Boiler Bracing. United States, 1879, p. 344.

Use and abuse. Roper (S.), 1876.

Use of thick Steel Boiler Plate. Parker (Wm.), 1885.

Water Supply of Boilers. Friswell, 1892.

Black's Safety apparatus for Steam Boilers. Callon (J.), 1853. App. 550.

Borradaile, Whiting and Company's patent felt. Advantages. Wicksteed (T.), 1840.

Harrison Boiler. Harrison (Joseph), jun., 1867.

STEAM BOILERS (General References)—*continued.*

Orvis system of increasing the economic Vaporization of Steam Boilers and preventing smoke in their furnaces. Experiments. Isherwood, 1891.

Parson and Pilgrim's invention for raising the temperature of steam in boilers. Parson and Pilgrim, 1858.

Player's patent furnace applied to the boilers on the "Anthracite" steam vessel. Manby (C.), 1840.

STEAM BOILERS (Corrosion, Incrustation and Sediment).

Anti-incrustator apparatus for removing Scale. Baker, 1866.

Boiler Deposits. Lewes, 1883.

Disincrustation. Ormsby, 1883.

Methods for preventing corrosion and the formation of scale. Davis (C. T.), 1884.

STEAM BOILERS (Explosions). Colburn, 1860; Nursey, 1863; Perkins (J.), 1837; Radcliffe, Lanc., 1882.

Bill to provide a more efficient remedy to persons injured and property damaged, 1871. Parliamentary..Papers, p. 467.

Boiler Explosions Act, 1882, Memoranda, 1888. Board of. Trade Reports, 1879–82, 1884, etc. Parliamentary..Papers, p. 467.

Boiler Explosion Committee evidence. Bramwell, 1871.

Causes of Explosion. Frost, 1848; Stewart (W.), 1848–49; Wilder (J.), 1847.

Comparison of the destructive energy in explosions of Steam boilers and of gunpowder. Airy (Sir G. B.), 1863, p. 21.

Destructive energy in the explosions of Steam-boilers. Airy, (Sir G. B.), 1863, p. 21.

Highly heated water, explosive force of. Sewell (J.), 1854.

Inventions of T. S. Easton for prevention of Explosions. Johnson (W. R.), 1842.

Kitchen Boiler Explosions, 1881. Goslin.

Memorial to John Hick. Liverpool Polytechnic Society.

Prevention of Explosions. Fairbairn (Sir W.), p. 403, 1851.

Records of Explosions. Marten (E. B.), 1869–89.

Remarkable properties of water. Bowman (J. E.), 1845.

Report. Airy (Sir G. B.), 1863, p. 23.

Report of Committee, 1836–37. Franklin Institute.

Report of Select Committee, 1870–71. Parliamentary..Papers, p. 467;

Steam boats. Redfield, 1839

Theory and practice. Thurston (R. H.), 1887, p. 311.

STEAM BOILERS (Explosions)—*continued.*

Acrefair, North Wales, New British Iron Co.'s Works.
Acrefair, 1882.

Bolton Boiler Explosion. Engineer's Report to Coroner.
Fletcher (L. E.), 1874.

Brierly Hill. Boiler explosion at Hill and Smith's Works.
Brierly Hill, 1882.

Burnbank. Explosion at W. Wallace and Co.'s Works, Burnbank, Glasgow, 1882. Burnbank.

"Cartago Nova," S.S. Report of fatal Boiler Explosion, Nov. 4, 1886, in the Albert Dock, Hull. Waugh (J.).

Deafhill Colliery, Trimdon, Durham. Report upon Explosion of two Boilers, 1889. Waugh (J.)

Drighlington, Boiler at. Report on Explosion of. Waugh (J.), 1889.

Great Bridge, Staffs. Boiler Explosion at Burrows and Burrows' Blue Brick Works. Great Bridge, 1882.

Halifax. Report on Boiler Explosion at Balme and Pritchard's.
Yorkshire Boiler Insurance etc., 1879.

Huddersfield. Report upon the Explosion of a Tramway Engine Boiler, 1891. Waugh (J.).

—— Report on Explosion of a Tramway Engine Boiler, June 3, 1891. Yorkshire Boilers Insurance, etc.

Kirkstall Road. Leeds Boiler Explosion, 1885. Report on.
Waugh (J.).

Lancaster, St. George's Quay. Report upon fatal Boiler Explosion on board steam dredger, 1887. Waugh (J.).

Linthorpe Iron Works, Middlesbrough. Head (J.), 1873.

Maidstone. Report on Explosion, 1881. Maidstone.

Manchester. Domestic Boiler Explosions. Memorial praying that an independent investigation should be held.
Manchester Steam Users' Assoc., 1894. Add. 518.

Manningham Mills, Bradford. Report upon Explosion of Steam Pipe at, 1889. Waugh (J.).

Marihaye, Seraing. Steam-Boiler Explosion.
Thonard (E. J. L.), 1868.

Narborough. Report on the Boiler explosion at the Red Hill Quarry belonging to Enderby and Stoney Stanton Granite Co., Oct. 25, 1893. Yorkshire Boiler Insurance, etc.

Newtown, near Wigan, Boiler Explosion, 1885. Report on.
Waugh (J.).

Pharos, S.S. Experimental Bursting of the boilers and superheaters. Pharos (Steam Ship), 1881.

Queensland. Report. Queensland, 1874, p. 70.

Sandy Hook. Steam Boiler Explosions. Descriptions of experiments, 1871. Thurston (R. H.), 1872, p. 309.

STEAM BOILERS (Explosions)—*continued.*

Stainland, near Halifax. Brocken and Co.'s Works, Firth House Paper Mills. Report upon Fatal Boiler Explosion, 1886. Waugh (J.).

Stoneclough. Explosion at R. Fletcher and Son's Paper Mills, 1879. National Boiler Ins. Co.

"Thunderer," H.M.S. Cause of Explosion of Boiler. Johnstone (James), 1877.

United States. Report to the Commissioner of Patents to, on the subject of Steam Boiler Explosions. United States, 1848, p. 344.

Walsall Boiler Explosion, May, 1880, and Halifax, Oct. '79. Reports on. Walsall, 1880.

"Westfield" Steam Boiler Explosion. Investigation and Report Thurston (R. H.), 1871, p. 311.

STEAM BOILERS (Feed Water).

Feed Water heating. Kirkaldy (J.), 1888.

Feed Water, system of heating with live steam. Kirkaldy (J.), 1891.

Feed Water heater (Kirkaldy's Compactum Patent). Kirkaldy (J.), 1891.

Fromentin Automatic Boiler Feeder. Hayes (J.), 1882.

STEAM BOILERS (Fuel).

Coke fuel. Ehrendorfer, 1885.

Combustion of fuel in furnaces by natural draught and by supply of air under pressure. Howden (J.), 1884.

Economy of fuel. Donkin and Co., 1874; Prideaux, 1853.

Fuel consumption and evaporation of water. Woods (E.), 1850.

Use of mineral oils as fuel. Maupeou, 1882.

Use of Petroleum. Bodde, 1865.

STEAM BOILERS (Inspection). Marten (E. B.), 1870.

Association of Steam Users, etc. Naples, 1891, etc.

Board of Trade rules for Boilers, Influence on the Commercial Marine of. Milton, 1883.

Boilers Registration Bill. London Chamber of Commerce.

Governmental Boiler Inspection. Fairbairn (Sir W.), 1870, p. 402.

Insurance by Joint Stock Companies Bill for Regulation, 1889. Parliamentary..Papers, p. 468.

Manchester Steam Users' Association. Memorandum by Chief Engineer, June 26, 1894. Manchester Steam Users' Assoc. Add. 518.

National Boiler Insurance Company. Engineer's Reports, 1867, etc. National Boiler Ins. Co.

National System of Steam Boiler inspection. Fletcher (L. E.), 1870.

STEAM BOILERS (Inspection)—*continued.*

Registration and Inspection Bills, 1887, 1890.
Parliamentary..Papers, p. 468.

Yorkshire Boiler Insurance and Steam Users Company. Engineers' Reports. Waugh (J.), 1886; Yorkshire Boilers Insurance, etc., 1880–3.

STEAM BOILERS (Legislation). Bailey (W. H.), 1891.

Laws. Delaunay-Belleville, 1886.

STEAM BOILERS (Safety Valves). Buel, 1875.

Annular Safety Valve. Hawthorn (W.), 1856.

Minimum diameter of the safety valve of the boiler. Thonard (E. J. L.), 1871.

Specification. Fenton (J.), 1854.

Specification of improvement in Safety-valves. Bodmer (J. G.), 1857.

STEAM BOILERS (Strength and Tests).

Boiler Tests. Barrus, 1891; Huet (A.), 1888.

Evaporative Tests. Kent, 1883.

Handbook of Boiler Trials. Thurston (R. H.), 1890, p. 309.

Strength of Cylindrical Boilers' Shells. MacColl, 1875.

Trials of Steam Boilers. Standard Method. Report. American Soc. of Mechanical Engineers, 1884. Add. 480.

Wear and Tear. Paget, 1865.

STEAM BOILERS (Tubular and tubulous). Krauss (F.), [1892].

Differential Tubular Boiler. Stimers (A. C.), 1865.

Tubular Boilers. Barret, 1868.

Tubulous Boilers. Emery, 1890.

Belleville Boiler. Isherwood, 1890.

Langlois' Movable Tubes for Steam Boilers, Sonolet (G.), 1867.

Perkins's Patent Steam Boiler. Parkes (J.), 1840. Improvement in Steam Boilers. Perkins (J.), 1836. Three reports of tests proving the advantages of the Perkins System of Boilers Perkins (A. M.), 1881.

Ward's patent water tube boilers. Report. Ward (C.), 1890.

STEAM ENGINES (General References). Aubuisson des Voisins, 1839; Bernoulli (C.), 1824; Birkbeck and Adcock, 1827; Bodmer (J. G.), 1834; Bourne (J.), 1878; Bramwell, 1878; Buchetti, 1880–88, 1884; Colding, 1851; Colyer, 1885, 1886; Dwelshauvers-Dery, 1889; Evers, 1887, 1889; Fairbairn (Sir W.), etc., 1858, p. 404; Farey, 1827; Hirsch (J.), 1890; Hirsch and Debize, 1885; Holmes (G. C. V.), 1887; Jacquin, 1870; Marsden (R.), 1886; Regnault, 1847–62; Reiche (H. von), 1869–71; Reuleaux, 1891; Reid (Hugo), 1838. Article for Encyclopædia Britannica. Robison (J.), 1818; Sinigaglia, 1889, '90.

STEAM ENGINES (General References)—*continued.*

Acceleration of parts by the alternate movement.
Sauvage (E.), 1892.

Anecdotes. Meikleham, 1829.

Application to mines, mills, steam navigation and railways.
Bourne (J.), 1846.

Application of the modern Theory of Heat to Steam Engines.
Anderson (W.), 1886; McCulloch, 1876.

Application of principles of Mechanics. Millar (W. J.), 1874.

"Automatic" Engines. Economics of.
Thurston (R. H.), 1892, p. 309.

Belgium. Police regulations. Belgium, 1884, p. 118.

—— Royal decrees, 1838, 1839. Belgium, p. 118.

Bill to provide for the examination of persons having charge of Steam Engines and Boilers on Land, 1888.
Parliamentary..Papers, p. 477.

Calculations. Formulas for. Unwin (W. C.), 1888.

Calorimetry. Dwelshauvers-Dery, 1892.

Catechism. Anonymous, 1890, p. 47; Bourne (J.), 1876. Chinese edition. Bourne (J.). Supplement, 1876. Handbook (key to the Catechism). Bourne (J.), 1865. Steam Engine Catechism. Grimshaw, 1889.

Chicago Exhibition, 1893. Gutermuth, 1893.

Comparisons, Engine. Evans (W. W.), 1870.

Compound. Trial of a semi-fixed compound engine.
Walther-Meunier and Keller, 1880.

Considered as a Heat engine. Cotterill, 1878, 1890.

Construction of Steam Engines. Improvements in.
Woolf (A.), 1855.

—— Theory and practice of. Jullien (C. E.), 1862.

—— Of traction and portable steam engines. Weber (H.), 1871.

Consumption of Steam and Water in Steam Engines. Ellis (W. I.), 1894. Add. 498. Method of lessening the consumption of Steam and Fuel in. Watt (James), 1855.

Copper Steam Pipes for modern High-Pressnre Engines.
Parker (Wm.), 1888.

Crank, action of the forces on the. Pole, 1852.

Curves. Smith (R. H.), 1888.

Cut-off in Steam Engines. Most economical point of.
Wolff (A. R.) and Denton, 1881.

Cylinder Condensation. Gately and Kletzsch, 1885.

Cylinder (Single). Means of economising steam.
Dwelshauvers-Dery, 1890

Cylinders. Pilbrow's Condensing Steam Cylinder engine.
Boyman, 1841.

—— Variation of Vacuum in the Cylinders. Hallauer, 1875.

—— Water in the. Anspach, 1892.

STEAM ENGINES (General References)—*continued.*

Descriptive History. Meikleham, 1831.

Design for the use of Mechanical Engineers. Whitham (J. M.), 1889.

Disc and Reciprocating Engine, Comparative trials of. Parkes (J.), 1842.

—— Patent Disc Steam Engine. Parkes (J.), 1841.

Distribution. Coste and Maniquet, 1886.

Economic condition of a steam engine without condensation acting as a simple, compound and triple expansion engine. Willans (P. W.), 1889.

Economical rates of expansion in. Rankine (W. J. M.), 1866.

Efficiency : a comparison of nature's engine and modern practice. Weir (J.), 1891.

Elementary treatise. Clark (D. K.), 1885.

Employed in navigation and on railways. Castor, 1860.

Escape and compression of steam. Hallauer, 1883.

Expansion gear, Zublin system. Sulzer [1878].

Experimental dynamic study of the steam engine. Dwelshauvers-Dery (V. A. E.), 1894. Add. 498.

Experimental Researches. Isherwood, 1863–65.

Experiments on. British Association, 1845 ; British Association, 1845. Add. 487.

Explained and Illustrated. Lardner, 1838, '40, '51. Wilder (J.), 1847.

Final Improvement of Steam Engine. Thurston (R. H.), 1891, p. 309.

Fireless, with natron filling. Honigmann, 1885.

Fixed, locomotive, marine. Gaudry, 1861–62.

French Navy, Steam Engines of the. Thurston (R. H.), 1866, p. 311.

Friction, comparative loss by, in beam and direct action. Pole, 1842.

Friction in Steam Engines. Dwelshauvers-Dery, 1890.

Friction of Non-Condensing Engines. Thurston (R. H.), 1886, p. 310.

Future, Steam Engine of the. Bourne (J.), 1879.

General theory. Woolhouse (W. S. B.), 1850.

Graphics of the Efficiencies of the Steam Engine. Thurston (R. H.), 1894, p. 309.

Grates, stoves or furnaces in machinery. Bodmer, 1834.

Growth of Steam Engine. Thurston (R. H.), 1878, p. 309.

Guide for the Stoker. Grouvelle and Jaunez, 1840.

Handbook. Haeder, 1893.

STEAM ENGINES (General References)—*continued.*

Handbook of Engine and Boiler Trials.
Thurston (R. H.), 1890, p. 309.

Heat. Steam Engines and other Heat Engines. Ewing, 1894.

—— Distribution of. Knoke.

High Pressure Steam Engines and Non-Condensing.
Roper (S.), 1887.

High-speed engines. Expansion-gear with regulator for.
Proell, 1887.

History. Alderson, 1834; Galloway (E.), 1836; Partington 1822; Smiles (S.), 1862.

Horizontal Steam Engines. Jobard, 1857.

Honigmann's fireless Soda boiler. Riedler, 1883.

Improved Steam Engine. Falck, 1776.

Improvements. Bodmer (J. G.), 1844; Gray (J.), 1841; Hall (S.), 1837, '40; Watt (James), 1855.

Indicator and Dynamometer, application of.
Main and Brown, 1864.

Indicator Practice. Hemenway, 1886.

Indicators. Instructions relating to their construction and use.
Crosby Steam Gauge and Valve Co., 1893. Add. 494.

Indicator, origin and progressive development. Le Van, 1890.

Indicator and Indicator Diagrams. Anonymous, 1888, p. 52.

—— Working explained by use of the Indicator.
Hopkinson (Joseph), 1871, '75.

Internal Wastes of Steam-Engine. Practical method for reducing.
Thurston (R. H.), 1890, p. 310.

Invention and improvement. Tredgold (T.), 1827, 1838–48, 1850–53.

Inventors. Galloway (W.), 1881.

Key to Steam Engineering. Anonymous, 1890, p. 47.

Lectures. McNaught, 1874; Unwin, W. C., 1869, p. 359.

Lectures on a new Steam Engine. English (T.), 1864.

Locomotive and stationary engines for transport in Lombardy.
Bruschetti, 1840.

Management. Bale, 1880.

Manuals. Hoblyn, 1842; Rankine (W. J. M.), 1861;
Thurston (R. H.), 1891, p. 309.

Manufacture of Engines and Boilers. Fitch, 1888.

Mathematical Theory. Baker (T.), 1865.

Mechanics. Morin and Tresca, 1863.

Method of converting rectilinear into rotary motion applied to.
Booth (Rev. J.), 1845.

Modelling, construction and running of steam engines.
Wallace (J.), 1865.

STEAM ENGINES (General References)—*continued.*

Modern Steam Engines.
Burgh (N. P.), 1864; Rose (J.), 1886.

Multiple-cylinder steam engine. Construction of diagrams of.
Mönch (E.), 1890.

Non-Condensing Engines. Tables and diagrams relating to.
Trowbridge (W. P.), 1872.

Patent for Improvements. Henson, 1841.

Patent for Improvements in Steam Engines, and in Machinery for Propelling Vessels. Jones (S. T.), 1848.

Patent to Joseph Bramah for his engine on a rotative principle.
Bramah, 1790.

—— New patent for a new principle. Congreve, 1819.

Philosophy of Steam Engine. Development of.
Thurston (R. H.), 1889.

Physical properties of permanent gases and of different kinds of Vapor. Nystrom, 1876.

Plans, elevations, etc. Scott (D.) and Jameson, 1847.

Popular Lecturés. Lardner, 1828, '32.

Portable Steam Engine. Head (J.), 1877;
Wansbrough (W. D.), 1887.

Portable engines. Construction. Weber (H.), 1871.

Practical essay. Murray (R.), 1840.

—— Steam Engine for practical men. Hann J. and Gener, 1854.

Practical notes. King (W. H.), 1870.

Practical Steam Engineers' Guide. Edwards (E.), 1882.

Practical View. Milne (John), 1830.

Processes of Steam in its development of Power by means of a Steam Engine. Isherwood, 1889.

Recent Discoveries. Dwelshauvers-Dery, 1871.

Reciprocation, obscure influences of, in high speed Engines.
Rigg (A.), 1886.

Regulator. Seeman (A.), 1881.

Relative proportions. Marks (W. D.), 1879.

Report of Select Committee on Steam Engines and Furnaces 1819–20. Parliamentary..Papers, p. 477.

Researches. Leloutre, 1873–74, '83, '84.

Simultaneous speeds of piston and valve. Claeys, 1889.

Specification of Patent Double Cylinder Engines.
Maudslay and Field, 1839.

Specification for improvements in Steam Engines.
Stevelly (J.), 1844.

Specfications of a Patent for improvements in.
Thornton (S.) and M'Connell, 1848.

STEAM ENGINES (General References)—*continued.*

Stationary Engine Driving. Reynolds (M.), 1885.
Steam gauges. Pagliani, 1890. Add. 525.
Steam in the engine, its heat, &c. Kauffer, 1873.
Steam Machinery, elementary lessons. Langmaid and Gainsford, 1893.
—— Engineering Precedents. Isherwood, 1859.
Steam using; or Steam Engine practice. Smith (Chas. A.), 1885.
Text Books. Goodeve, 1879, 1887; Jamieson (Andrew), 1886, '92.
Theory. Devillez, 1861; Dyer (H.), 1886; Northcott, 1876; Pambour, 1838, '39, '44.
Theory of Condensers. Dwelshauvers-Dery, 1889.
Thermodynamics and Applications to Steam Engines. Madamet, 1889.
Thermodynamics of Steam Engines and other Heat Engines. Peabody (C. H.), 1889.
Transmission of Force, Solution of the, in a Steam Engine. Jacobus, 1890.
Treatises. Clark (D. K.), 1892; Hann (J.), 1847; Paris (E. E.), 1860; Rigg (A.), 1878 and 1894; Russell (John S.), 1841.
Treatise on Steam Motors. Armengaud (J. E.), 1844, 1861–62.
Treatise on Steam and Locomotion. Sewell (J.), 1852–53.
United States. Annual report of the Chief of the Bureau of Steam Engineering. United States, 1889, p. 344.
—— Steam Engine Practice, 1884. Hoadley (J. C.).
Use of counter-pressure steam as a brake. Ricour, 1870.
Valves. Explanation of the action and construction of plain and cut-off Slide Valves. Halsey (F. A.), 1890.
—— Designing Valve Gearing. Welch (E. J. C.), 1875–82.
—— Application of the slide valve and link motion to stationary, portable, locomotive and marine engines. Auchincloss, 1872.
—— Movement of Slide Valves by Eccentrics. Mac Cord, 1873.
—— Remarks on Slide Valve. Thorn (W H.), 1886.
—— Slide valves. Pichault, 1886.
—— Safety valves. Pagliani, 1890. Add. 525.
—— Slide Valve gears. Bilgram, 1878.
Various types of Steam Motors. Sauvage (E.), 1892.
Vibrating or Reciprocating motion, new methods of applying to produce a continued circular motion round an axis, etc. Watt (James), 1855.
Watt. Since the days of. Dyer (H.), 1889.
Young Steam Engineer's Guide. Evans (O.), 1810, 1825.

Bromsgrove Engine Factory. Drawings, specification, quantities, etc., 1841. Moorsom (W. S.).

STEAM ENGINES (General References)—*continued.*

Brown's Patent Rotary Expansive Engine. Inspection and Tests. Jamieson (Andrew), 1891.

Bryce-Douglas patent valve gear for marine and locomotive engines. Anonymous, 1886, p. 41.

Corliss Engines. Uhland (W. H.), 1879–82; Hallauer, 1873; Henthorn and Thurber, 1894.

Craig's patent rotary steam engine. Craig (A.), 1841.

Davies Rotary Engine. Dredge (W.), 1849.

Fairlie Engines. American Engines and. Evans, 1877.

Hall's Improvements. Hall (S.), 1837, '38.

Hirn engine of superheated steam. Leloutre, 1865.

—— Hirn and Dwelshauvers' Theory of the Steam Engine. Thurston (R. H.), 1890, p. 309.

—— Study on the experiments of Hirn and Hallauer. Pasquier, 1881.

—— Summary of Hirn's method of testing. Poupardin, 1875.

Manby's (A.) Oscillating Engine, Patent Specification and Drawing, 1821. Manby.

Mash's Invention of Improvements. Mash, 1861.

Parsons (P. M.) Improvements, Patent. Parsons (P. M.), 1843.

Roper's simple Process of approximating their Horse-power. Roper (S.), 1884.

Savery's Fire Engine and its adaptation to ships. Savery (A.), 1698, 1827.

Watt and the Steam Engine. Caxton, 1852.

—— Infringement on Watt's patent for an Improvement. Bramah, 1797.

—— Particulars relating to Watt's Steam Engine. Thompson (Benjamin), 1847.

Wright's Patent Steam Generator. Wright (James), 1860.

STEAM ENGINES (Compound).

Combined Steam Engines. Du Trembley (P. V.), 1850–1. Add. 497.

Compound Engines. Fréminville, 1878.

Du Trembley system, on the ship "France." Meissonier, 1856.

Ericsson Compound Engine. Isherwood, 1890.

Expansion Steam engine. Claeys, 1888; Hodge, 1849; Proell, 1886.

Experimental Comparison of a Single cylinder Engine with a Triple-expansion Engine. Isherwood, 1893.

Experiments on a Condensing Compound Engine. Isherwood, 1885.

STEAM ENGINES (Compound)—*continued.*

High Pressure Multiple-Expansion Steam Engine. Maximum contemporary economy (Thurston).
Allis and Co., 1894. Add. 480.

High pressure steam, use of. Rowan (F. J.), 1880.

History and Theory of Action. Mallet A., 1884.

Philosophy of the Multi-Cylinder or Compound Engine.
Thurston (R. H.), 1889, p. 310.

Porter Allen. Porter (C. T.), 1884.

Quadruple Engines, application of High Pressure Steam to.
Adamson (D.), 1875.

Reynolds (Prof. Osborne), triple expansion machines.
Richard (G.), 1890.

Roentgen (G. M.), inventor of the Multiple Engine.
Brueckmann, 1892.

Short Treatise. Turnbull (J.), 1873.

Strange. Effect of using in a Non-condensing Engine saturated steam alone, and of using it mixed with compressed hot air according to Strange's system. Isherwood, 1886.

Thermal Analysis of a "Tandem" Compound Engine.
Thurston (R. H.), 1893, p. 311.

Triple Expansion Engine.
Schröter, 1890; Thorn (W. H.), 1886.

Universal Condensing Engine. Craddock, 1844.

Woolf engine. Hallauer, 1875; Leloutre, 1885.

Worthington High Duty Pumping Engine, patented.
Worthington (C. C.), 1889. History of its invention and development. Worthington (H. R.), 1876.

STEAM ENGINES (Cornish).

Condensing Engines in use at some of the Cornish mines, effective power of. Wicksteed (T.), 1838.

Contract and Specifications for Cornish Pumping Engine.
Providence, 1873.

Cornish, and Boulton and Watt's Pumping Engines. Relative power and effect produced by. Wicksteed (T.), 1842. Erected at the East London Water Works, Old Ford. Explanation of plates of. Wicksteed (T.), 1842.

—— Boulton and Watt's, and Hornblower's Engines.
Wilson (Thomas), of Truro, 1793.

Cornish Pumping Engine. Pole, 1844.

Cornish Pumping Engine. Contract and Specifications.
Providence, 1873.

Cornish Pumping Engines, useful effects of, showing average working for long periods, etc. Wicksteed (T.), 1859.

STEAM ENGINES (Cornish)—*continued.*

Historical statement of the improvements made in the duty performed by the Steam-engines in Cornwall.
Lean (T. and J.), 1839.

Progressive improvements made in the efficiency of, in Cornwall.
Gilbert (D.), 1830.

STEAM ENGINES (For Electric Light).

Driving Electric Light Machinery in the Colonial and Indian Exhibition, 1886. Davey, Paxman and Co.

Stationary Steam Engines especially adapted to Electric Lighting purposes. Thurston (R. H.), 1884, p. 311.

Steam generating plant. Mallet (A.), 1884.

STEAM ENGINES (Steam Jackets).

Abuse of the Steam-jacket practically considered.
Fletcher (W.), 1878.

Efficiency of Maximum Steam-jacket.
Thurston (R. H.), 1874, p. 310.

Genesis, purpose, etc. Isherwood, 1893.

Theory of the Steam-jacket. Thurston (R. H.), 1894, p. 311.

STEAM ENGINES (Tests).

Method of testing condensing engines. Donkin and Co., 1874.

Test of a steam plant at the Washington Mills, Lawrence, Mass., in the case of the Dickson Manufacturing Company *v.* the Washington Mills Company. Leavitt and Henthorn, 1890.

Three reports of tests proving the advantages of the Perkins System of Engines designed for steam at higher pressure.
Perkins (A. M.), 1881.

Trial of the Engine and Boilers at Messrs. T. Nuttall and Sons, Oak Mill, Farnworth, 1880. Longridge (M.).

Trials. Dyer (H.), 1889.

STEAM HAMMERS. Casalonga and Casalonga, 1888; Pimentel, 1873. History. Rowlandson (T. S.), 1875.

STEAM NAVIGATION. *See* Ships and Steam Vessels, p. 614.

STEAM PIPES.

Report upon the coverings for Steam Pipes.
Boston Manufacturers Mutual Fire Insurance Co., 1883.

Strength of Copper Steam Pipes, 1888.
Institution of Eng. and Shipb.

STEAM TRACTION ON ROADS.

Economy of Steam Power on Common Roads.
Young (C. F. J.), 1860.

Steam Carriages on turnpike roads in Scotland.
Gurney, 1832; Dawncy (W.), 1834. Add. 495.

STEAM TRACTION ON ROADS—*continued.*

Steam Carriage. Letters to T. Deans on Patent Specifications. Russell (John S.), 1834.

Steam Coach Company. Letter. Crawford (A. F.), 1835. Add. 494.

Report from Select Committee, 1831. Parliamentary. . Papers, p. 516.

Steam Locomotion on Common Roads. Bramwell (Sir F. J.), 1894. Add. 487; Gordon (A.), 1832, 1836; Agudio Traction Engine. Agudio, 1861. Thomson's Road Steamer. Thomson (R. W.), 1870.

Steam Rollers on Macadamized Roads, Working of. Arntz, 1866.

Steam Road-rolling. Aveling, 1878, 1887; Greenwell (A.), 1893, '94; Lovegrove, 1871; Petrlik (C.), 1884.

Traction Engines and Steam Road Rollers; or the past, present, and future of steam on the common road. Thurston (R. H.), 1873, p. 311.

Traction engine. Broüyn (E. de), 1874.

STEAM TURBINES. *See* Turbines.

STEEL (General References). Landrin (H. C.), 1868.

Action of Air and Water upon cast and wrought Iron and Steel. Mallet (R.), 1843.

Bronze Steel. Owen (John F.), 1875.

Carbon in Steel, Condition in which it exists. Abel (Sir F. A.), 1885; Abel and Deering, 1883.

Carbon and Silicon in Steel, their Condition. Snelus (G. J.), 1870.

Cast Steel Ingots, Structure of. Chernoff, 1878.

Chrome Steel production, constitution and properties of. Boussingault, 1878.

Couhard's Cellular theory of Steel. Couhard, 1888.

Creators of the Age of Steel. Jeans (W. T.), 1884.

Crystallization of Steel Ingots. Tchernoff (D.), 1879.

Definition of Steel. Greiner, 1875; Philippart, 1875.

Economics, Steel. Skelton (H. J.), 1891.

Effect of internal strains in hardened steel. Bond (G. M.), 1890.

Hardening and tempering. Roberts-Austen (W. C.), 1889, p. 120.

Haswell and Whitworth's Steel Forgings. Egleston, 1885.

Heat treatment of Steel. Howe (H. M.), 1885.

Influence of temper on the electrical resistance. Le Chatelier (H.), 1891.

STEEL (General References)—*continued.*

Malleable Steel. Martens, 1887.
Management of Steel. Ede (G.), 1873.
Manganese Steel, physical properties. Barrett (W. F.), 1886.
Mechanical and other properties. Berkley (Sir G.), 1868, 1870.
Metallurgy. Howe (H. M.), 1890; Percy (J.), 1864.
Mild Steel Experiments. Admiralty, 1880.
—— Applied to Naval and Military purposes. Mackinlay, 1885.
Permanent magnetism of Steel. Osmond, 1885.
Phosphoric steel, mechanical properties. Gruner (L.), 1870.
Soft Steel used in the building of ships. Bureau Veritas, 1879.
Steel, temper of. Osmond, 1889; Reiser, 1881.
Theory. Müller (F. C. G.), 1888.
Tool Steel, Treatment of. Korb and Turner, 1889.
Warfare, Steel for. Howe (H. M.), 1886.

Abuchoff Cast Steel Works, New Boiler-House at. Keerayef, 1870.
England, Steel industry in. Siemens (Sir W.), 1878, p. 198.
Indian Iron and Steel Company. Origin, present state and prospects, 1839. Indian.
—— Indian Steel, known in England as "Wootz." Puckle, 1863.
United States. Technical condition of the Steel Industry. Barnes (P.), 1885.
—— Directory of Steel Works, 1878–88. American Iron and Steel Assoc.

STEEL (Composition and Properties of).

Compression of Fluid Steel. Annable (W.), 1882.
Properties of Steel for constructive purposes. Adamson (D.), 1875, 1878; Bresson, 1886; Hunt (A. E.), 1883.
Transformation of cast iron into steel. Berard process. Berard (A)., 1870.

STEEL (Manufacture of). Caspersson, 1882; Chernoff, 1876; Gruner (L.), 1872; Heaton, 1869; Knab, 1889; Larkin (J.), 1869; Overman, 1851, '73.

Adaptation of Bessemer Plant to the Basic Process. Holley, 1880.
American Installations. Greiner, 1882.
—— Bessemer process and works in the United States. United States, 1868, p. 351.
Basic Bessemer and Thomas processes. Wedding (H.), 1884.
Basic Bessemer Process. Egleston, 1885.
Basic open-hearth Steel. Davis (J.), 1891.

STEEL (MANUFACTURE OF)—*continued.*

Basic open-hearth Steel Process. EGLESTON, 1885.
Basic Refractory Materials. EGLESTON, 1885
Basic or Thomas-Gilchrist process for 1886. GILCHRIST (P. C.)
Bessemer Castings. JANOYER, 1873
Bessemer and Martin Processes. LANDRIN (H. C.), 1868
Blow-holes in Open-hearth Steel. HEAD (J.), 1886
Carbon, Silicon, Sulphur and Phosphorus, Separation of, in the refining and puddling furnace. BELL (Sir I. L.), 1877, p. 120.
Cast Steel Manufactory near Essen. KRUPP, 1858–62, 1873.
Cellular theory of its properties. OSMOND and Werth, 1885.
Crucible cast Steel. Manufacture. SEEBOHM (H.), 1884.
Dephosphorizing in the Converter. MASSENEZ, 1880.
Furnaces for the Manufacture of, on the open hearth. HEAD (J.), 1886.
Handbook. HARTMANN (C.), 1861.
Hardening, Experiments on. ABEL (Sir F. A.), 1883.
Heaton Process. GRUNER (N.), 1870.
History, manufacture, properties and uses. JEANS (J. S.), 1880.
Industry, Bessemer Steel, past and present. Statistical sketch of. BESSEMER (Sir H.), 1894. Add. 485.
Mild Steel. Experiments on, manufactured by Colville at the Dalzell Steel Works, Motherwell. TRAILL (T. W.), 1885.
Mild Steel manufactured by the Steel Company, Scotland, and by the Weardale Iron and Coal Company. Experiments. TRAILL (T. W.), 1881 and 1885.
Ores, Bessemer Steel, and Methods. FITCH, 1882.
Patent Processes for purifying Cast-Iron into Steel and Wrought-iron. HENDERSON (J.), 1870, '71, '72.
Puddled Steel. ANSIAUX and Masion, 1865.
Question, Iron, considered with reference to the Bessemer process. HALL (Joseph), 1857.
Siemens-Martin furnace. Ore process. POURCEL, 1891.
Transformation of iron and carbon. OSMOND, 1888.
Wedding's Basic Bessemer Process. WEDDING (H.), 1891.

Canada, production and manufacture in. BARTLETT (J. H.), 1885.
France, Steel Manufacturing and Engineering Works in. PARKER (Wm.), 1883.
Styrian Open-Hearth Steel. KORB and Turner, 1889.

STEEL (USE OF, IN CONSTRUCTION).

Basic steel as a structural material. TETMAJER, 1890.
Classification and use of Steels. DESHAYES, 1880.
Employment in building. BARBA, 1875.

STEEL (USE OF, IN CONSTRUCTION)—*continued.*

Roll-Turning for Sections, working drawings for rails, sleepers, etc. SPENCER (A.), 1891, 3.

Use of Steel in Constructions. PERISSÉ, 1884.

Use of, for constructive purposes. BARBA (J.), 1875; DESSOYE, 1858.

Use of Steel Castings in lieu of Iron and Steel Forgings for Ship and Marine Engine Construction. PARKER (Wm.), 1883.

See also IRON AND STEEL.

STEEL RAILS. *See* PERMANENT WAY.

STEELYARD. Use for automatic weighing of grain. GUÉRARD, 1889.

STEERING. *See* RUDDER.

STEREOMETRY. BAILLAIRGÉ, 1875, '76.

Stereometrical Tableau. BAILLAIRGÉ, 1873, 1876.

STEREOMETRICON. BAILLAIRGÉ, 1880.

STEREOSCOPE. History, theory and construction. BREWSTER, 1856.

Pseudoscope, 1852. MOIGNO.

STONE.

Analyses of granite, limestone and sandstone. BURGOYNE (Sir J. F.), 1868.

Artificial stones with a silica base. RANSOME (F.), 1848.

Expansion of different kinds of stone from increase of temperature. ADIE, 1835.

Ransome's patent, or Portland Cement Concrete. BUTLER (J. W.), 1871.

Table for stone measurements in feet and inches. PARRY (J. W.), 1888.

STONE BREAKING (BY MACHINERY). BALLANTINE (W.), 1886.

STONE CUTTING. DOULIOT, 1862; LA RUE, 1764.

Blasting and Quarrying of. BURGOYNE (Sir J. F.), 1868.

Stone-masonry and stone-cutting. TREDGOLD (T.), 1824.

Stone Planing machine. HUNTER (J.), 1836.

Stone Polishing Machines. SCHWARTZE, 1885.

Stone Working Machinery. BALE, 1884.

STONE IMPLEMENTS. Mineralogical nature of some Stone implements found in Portugal. BENSAUDE (A.), 1884.

STONES (Building). Anonymous, 1873, p. 56; Bevan (G. P.), Industries, vol. 2.

Bath stone (various kinds of). Randell and Saunders, 1850.

Cause and prevention of decay. Egleston, 1886.

How to get it and how to use it. Luard (C. E.), 1890.

Improvements. Günther, 1870.

Magnesian limestones of Yorkshire, Derbyshire, and Notts. Smith (Chas. H.), 1845.

Report on results of a competition for the discovery of a superior building stone. Victoria, 1858, p. 375.

Strength. Rziha, 1889.

Alleghany County. Stone used for structural purposes in. Hunt (A. E.), 1889.

Caen and Aubigny Stone. Luard, Beedham and Co.

California, Building Stones of. Jackson (A. W.), 1888.

Colonial Building Stones. Knight (J. G.), 1859.

Craigleith, Binnie, Gifnock and Patrick Bridge, Building Sandstones of. Bloxham, 1858.

Great Britain and foreign countries, Building and Ornamental Stones of. Hull (E.), 1872.

India. Gwalior Territory Stone. Thomason Civil Engineering Coll., 1853–4.

London, selection of, for the new Houses of Parliament. Houses of Parliament, 1839.

—— Prevention of decay in the stone of the Houses of Parliament. Houses of Parliament, 1868–70.

Victoria (Patent) Stone Company, 1883. Patent Victoria.

STORMS. *See* Meteorology.

STOVES. Eckstein, 1852.

Air stove grates, commonly called American Stoves. Sharp (J.), 1781.

Thermometer Stove, directions for making and using. Arnott, 1838.

STREAM LINES, Mathematical theory of. Rankine (W. J. M.), 1870.

STREETS.

Plates and Views of Streets. Ashdown and Others.

Road and street cleaning company. Road and Street Cleaning Co., 1847.

Street Cleansing. Richter (E.), 1894. With the Hercules Street Cleansing Machine. Mendelssohn.

Street Watering with Sea Water. Terry (S. H.), 1888.

Width of streets in relation to the height of buildings. Raddi, 1891.

STREETS—*continued.*

Berlin. Asphalt. SCHUBARTH (E. O.), 1881.

Carlisle. Paving, flagging, edging of the public Streets. McKIE, 1859.

—— Materials for the repair and formation of streets. McKIE, 1877.

Dundee. Street Improvements. GREIG (A.), 1883.

London. Acts for better paving, improving, and regulating the Streets, 1817, '25, '54. LONDON, p. 269.

—— Regulations of projections of Area Coverings, Area Gratings, etc., upon the public ways. HAYWOOD (W.), 1856, p. 34.

—— Areas, lengths, and names of the Public Ways. HAYWOOD (W.), 1879, p. 35.

—— London Streets and Buildings Bill. MASON (F.), 1893. Add. 519.

—— London Streets and Building Bill, 1894. Report from Select Committee on. LONDON. Add. 516.

—— Metropolitan Street Improvements Bill. Minutes of Evidence, 1872. LONDON, p. 269.

—— Metropolitan Street Improvements Bills, Acts, etc., 1877. LONDON, p. 269.

—— London Bridges and Subways across Carriage-Ways for the use of pedestrians. HAYWOOD (W.), 1863, p. 34.

—— Street re-alignment and reconstruction of Central London. BRIDGMAN, 1886.

—— Report on Street Cleansing. HAYWOOD (W.), 1851, '52, p. 34.

—— Street Improvements. CAWSTON, 1893.

—— Improvements in the Metropolis proposed by the Metropolitan Board of Works. HAYWOOD (W.), 1872, p. 34.

—— Street Improvements (Metropolitan Board of Works), 1872. LONDON, p. 270.

—— New Street to form the grand communication between eastern and western parts. HESKETH, 1854.

—— Street nomenclature. WHITE (E.), 1858.

—— Suggestions for relieving the overcrowded thoroughfares. MITCHELL (Joseph), 1857.

—— Streets of London, and how to make them passable, 1860. LONDON, p. 270.

—— Street Paving and Cleansing of the Metropolis. Report 1875. SOCIETY for Encouragement of Arts, etc

—— Mode of constructing the surface. MITCHELL (Joseph), 1870.

—— Suggestions for a thoroughfare through the Metropolis. BEAUMONT (A.), 1860.

STREETS—*continued.*

London. Traffic and improvement in the public ways. HAYWOOD (W.), 1866, '67, p. 34. Suggested Improvements. CARR (H.), 1871.

—— Construction of Vaults beneath public ways. HAYWOOD (W.), 1856, p. 34.

—— Street Surface Watering. HAYWOOD (W.), 1856, p. 34.

—— Best arrangement of City Streets. HAUPT (L. M.), 1877.

—— Fleet Street and Ludgate Hill, Newton's plan for forming a Subway between. HAYWOOD (W.), 1863, p. 34.

—— Holborn Valley Improvement. Report of Improvement Committee. HOLBORN, 1872.

—— Widening King William Street, Fenchurch Street and Aldgate, 1874. LONDON, p. 269.

—— Lower Thames Street. Traffic, 1882. LONDON, p. 270.

—— Formation of Subways in the vicinity of the Mansion House. HAYWOOD (W.), 1885, p. 35.

—— Widening of Mansion House Street and the Poultry. HAYWOOD (W.), 1865, p. 34.

—— Proposals for raising £350,000 for forming a new street from Moorgate, to be called "New Mansion House Street." FORTUNE, 1826.

—— Queen Victoria Street, Opening, 1871. LONDON, p. 269.

—— Proposed Improvement of the eastern side of St. Paul's Churchyard. HAYWOOD (W.), 1886, p. 35.

—— Strand Improvement Bill. Special Report, 1890. LONDON, p. 270. Widening of the Strand by the removal of St. Clement Danes Church. Letter and Plan proposing. STREET (G. E.), 1871.

—— Proposed new street from Waterloo Bridge to the Commercial Road. BEARDMORE (N.), 1850.

New York. Laying out of the 23rd and 24th Wards, 1876, '77. NEW YORK CITY.

Paris. Asphalt and Bitumen. PARIS, p. 456.

See also PAVEMENTS.

STRENGTH OF MATERIALS (GENERAL REFERENCES). BARLOW (P.), 1867; BOVEY, 1893; BOX, 1883; COLLIGNON (E.), 1869–76; DUQUESNAY, 1890; FERRIA, 1885; FLAMANT, 1886; GAUDARD, 1871; KENT, 1879; MORIN, 1853, '57; THOMASON Civil Engineering Coll., 1862; WARR (G. F.), 1851.

Analytical theory of bending moments produced by travelling load systems. ALEXANDER (T.), 1879

Building materials. BAUSCHINGER and others, 1887. Trials. Conferences, 1884, '86. BAUSCHINGER, 1887. Method of trial. CONFERENZ zur Vereinbarung, 1884, '90.

Durability of Materials. CLARK (E.), 1869. Add. 492.

STRENGTH OF MATERIALS (General References)—*continued.*

Elastic limit. Duguet, 1882–5.

Elasticity of Metals. Kupffer, 1860.

Elasticity of Materials. Bauschinger, 1882.

—— Elasticity and Resistance of the Materials of Engineering. Burr (W. H.), 1883.

—— Mathematical theory of the elasticity of solid bodies. Lamé, 1866.

—— Strength, Elasticity, Ductility and Resilience of Materials of Machine Construction. Thurston (R. H.), 1874, p. 310.

—— History of the Theory of Elasticity and of the Strength of Materials. Todhunter (I.), 1886–93, p. 316.

Engineering Construction, Strength of materials used in. Whildin (J. K.), 1867.

Equilibrium and Stiffness of Frames. Maxwell (J. C.), 1864.

Fatigue of an inflected solid. Antoine (C.), 1882.

Kirkaldy's (D.) System of Mechanical Testing, Illustrations of. Kirkaldy (W. G.).

Mechanical Properties of Materials of Construction. Thurston (R. H.), 1874, p. 310.

Resistance of materials. Madamet, 1881, 1891; Maier (F. F.), 1881; Planat, 1888; Thurston (R. H.), 1873, p. 310; Wood (De V.), 1883; Roffiaen (E.), 1858.

Resistance of Materials under Impact. Merriman (M.), 1894. Add. 520.

Resistance to crushing. Michelot, 1863–71.

Scantling Diagram for Stiffness. Mackesy, 1879.

Strains in framed structures. Du Bois, 1884.

Stresses caused in an elastic solid by inequalities of Temperature. Hopkinson (J.), 1879.

Stresses in statically indeterminate structures. Anonymous, 1892, p. 56.

Structures, Strength of Materials and. Anderson (Sir J.), 1873.

Tables of moments of Inertia. Osborn (F. C.), 1889.

Technical studies of materials. Kick (F.), 1882.

Text Book. Thurston (R. H.), 1885, p. 311.

Thermo-elastic properties of solids. Hopkinson, 1887.

Thomson, Alexander, Moment Delineator, Application of, to maximum bending moments due to moving loads. Alexander (T.) and Thomson, 1890.

Torsional Resistance of Materials determined by a new apparatus with automatic registry. Thurston (R. H.), 1873, p. 311.

Transformation of surfaces by bending. Maxwell (J. C.), 1854.

STRENGTH OF MATERIALS (General References)—*continued.*

Boyne Viaduct, Strength of a lattice road Girder at. Stoney (B. B.), 1871.

France. Commission of methods of trial of materials of construction. France, 1894. Add. 501.

Roorkee. Calculations of Strength of Tresses for re-roofing Montgomery Hall. Lall (K.), 1877.

United States. Inspection of Materials of Construction in. Clapp and Hunt, 1890.

See also Tests.

STRENGTH OF MATERIALS (Specific Materials).

Cement (Hydraulic). Michaelis (W.), 1889.

Glass Torsional strain which remains in a glass fibre after release from Twisting Stress. Hopkinson (J.), 1878.

Gun metal compositions, loss of strength and ductility, when raised to high temperatures. Farquharson and Weston, 1877.

Iron. Barlow (P.), 1817, 1824.

—— Cast Iron. Hodgkinson (E.), 1846.

—— Anthracite Cast Iron. Strength and other properties. Fairbairn (Sir W.), 1840, p. 401.

—— Cast, and Malleable. Barlow (P.), 1837, 1851.

—— Cast and Wrought. Moll (C. L.), and Reuleaux, 1853.

—— Investigations into the Internal Stresses. Kalakoutzky, 1888.

—— Relative strength of common and toughened cast iron. Owen (J.), 1847.

—— Practical Essay on Strength of Cast Iron and other metals. Tredgold (T.), 1822–61.

—— Strength and other properties. Fairbairn (Sir W.), 1838, p. 401. Obtained from the hot and cold blast. Fairbairn (Sir W.), 1838, p. 402.

—— Malleable Iron. Transverse strength. Barlow (P.), 1835.

—— Anthracite Pig Iron. Evans (R.), 1840.

Wrought Iron. Duleau, 1820.

—— Wrought Iron and Chain Cables. Beardslee, 1879.

—— Wrought iron and steel. Inquiry into tensile strength. Kirkaldy (D.), 1863.

—— Wrought Iron plates and their riveted joints as applied to Shipbuilding. Fairbairn (Sir W.), 1850, p. 401.

—— Tensile strength of wrought iron at various temperatures. Fairbairn (Sir W.), 1857, p. 402.

Iron and Steel. Adams, H., 1887; Resal (J.), 1892. Effect of repeated heating and cooling. Barnaby (J. F.), 1882.

—— Influence of temperature on the strength and ductility of Steel and Iron Plates. Barnaby (J. F.), 1882.

STRENGTH OF MATERIALS (SPECIFIC MATERIALS)—*continued.*

Iron plates, effects of Heat on the bending qualities of. BARNABY (J. F.), 1882.

Ironwork, Strains in. ADAMS (H.), 1884.

—— Strains on structures of Ironwork. SHEILDS (F. W.), 1861.

Metal piles, internal equilibrium. ALLIEVI, 1882.

Metals. Mechanical properties of, as derived from repeated meltings. FAIRBAIRN (Sir W.), 1854, p. 402.

Permanent Effects of strain in Metals. THURSTON (R. H.), 1890, p. 310.

Steel. Elastic point. DAVID, 1889.

—— Inquiry into the mechanical properties of steel. Sweden. KIRKALDY (D.), 1873.

—— Investigations into the Internal Stresses. KALAKOUTZKY, 1888.

—— Behaviour of, under mechanical stress. CARUS-WILSON, 1890.

—— Rupture of, by longitudinal stress. CARUS-WILSON, 1890.

Stone, Comparative value of various kinds of. FAIRBAIRN (Sir W.), 1857, p. 402.

Stone, &c. Compressive resistance of Freestone Brick Piers, Hydraulic Cements, Mortars, and Concretes. GILLMORE (Q. A.), 1888.

Timber. BARLOW (P.), 1817, 1824, 1837, 1851.

—— Tests of Strength of Douglas Fir (Paget Sound or Oregon Pine) and comparison with other woods used for structural purposes. PACIFIC PINE Lumber Co., 1894.

STRENGTH OF SIMPLE CONSTRUCTIONS.

Beams. COLLIGNON.

Beams, Columns, and Arches. BAKER (Sir B.), 1870.

Beams and Columns. COUSINS, 1889. Cast Iron. TURNBULL (W.), 1831, '32. Cast Iron Columns. THACHER, 1874.

Beams and Girders. New Formulas for loads and deflections of. DONALDSON (W.), 1872.

Bridge arches, resistance. PERRODIL, 1879.

Bridge girders and Roof trusses, Strains upon. CARGILL, 1873.

—— Physical cause of increased deflection of girders exposed to the transverse strain of a rapidly passing load. MALLET (R.), 1856.

—— Pillars of Cast Iron. HODGKINSON (E.), 1840, '57.

—— Railroad Bridges. MELBER, 1882.

—— Stresses in bridge and roof trusses. BURR (W. H.), 1880, 1886.

—— Original and useful formulas specially applied to Tubular Bridges, etc. TATE (T.), 1850.

STRENGTH OF SIMPLE CONSTRUCTIONS—*continued.*

Chains, strength of small.
HELE-SHAW (H. S.), 1892. Add. 506.

Columns (Wrought Iron), safe strength. OSBORN (F. C.), 1889.

Ferro-bronze rolled bars. Mechanical properties.
KIRKALDY (D.), 1887.

Girders, Arches, Trusses. Method of calculating strains on.
YOUNG (E. W.), 1873.

—— Steel and Wrought Iron.
KONINKLIJK Instituut van Ingenieurs, 1885.

—— Calculation of Strains. HUMBER, 1868, '85.

—— Formulas for Flange Stresses in Single-braced Warren Girder uniformly girded. MOON (R. A.), 1889.

—— Keels, riveting of iron. Girders and similar structures. Theory of. ANTOINE (C.), 1882.

—— Strains in. STONEY (B. B.), 1866–69, 1886, 1873.

Metal Pillars. Internal equilibrium. ALLIEVI, 1882.

Riveted Joints, Strength and proportions of.
STONEY (B. B.), 1885.

Shafting, Strength of, subjected to both Twisting and Bending.
LANZA, 1887.

Trusses, Strains in, computed by means of diagrams. RANKEN, 1879; Trusses of Wood and Iron. GRIFFITHS (W.), 1886.

Tubes. Resistance of, to collapse.
FAIRBAIRN (Sir W.), 1858, p. 402.

STRIKES.

Coal Strikes. Disturbances at Featherstone. Evidence and Report. FEATHERSTONE, 1893.

"On principle." RANSOME (J. S.), 1890.

Political Economy in its relation to Strikes. MOLESWORTH, 1890.

STRUCTURES. *See* BUILDINGS.

STUCCO.

Lime, Mortar, Stucco, and Cement. DONALDSON (T. L.), 1840.

Right of using oil-cement or composition. ANONYMOUS, 1778, p. 40.

SUBMARINE MINES. Manual, 1880.
PARLIAMENTARY..Papers, p. 516.

SUBMARINE VESSELS. Hypydor, a vessel for descending and travelling under Water, and ascending and navigating at the surface as required. WATKINS (R.), 1887.

SUBMARINE WORKS.

Submarine Works (Diagrams). WINDER (I. R.), 1850.

SUBWAYS.

Greenwich and Millwall Subway Company. Act to revive and extend the powers 1887. GREENWICH.

SUBWAYS—*continued.*

Liverpool and Birkenhead Subway Bill, 1880. LIVERPOOL and Birkenhead.

London. Metropolitan Subways Bill. Report and Minutes of Evidence, 1864–67. LONDON, p. 270.

—— Tower Subway. BARLOW (P. W.), 1867. Tower Subway Bill, Report of the Lords' Select Committee and Minutes of Evidence, 1883. TOWER Subway.

SUGAR.

Automatic "Megass Fireman." ABELL, 1892.

Guide for the manufacture. BASSET, 1873–75.

Guide to the Canefield and the Sugar Factory. ANONYMOUS, 1887, p. 51.

Handbook for planters and refiners. LOCK and Newlands, 1888.

Juice of the sugar cane. ICERY, 1865.

Manufacture of raw sugar by evaporation in vacuo, and curing by the pneumatic process. OAKS and Dodson, 1834.

Manufacture of Sugar from the Sugar Cane. SOAMES (P.), 1872.

New method of analysing Sugar. DALTON, 1840–42.

Patent process for increasing the product of Sugar from Cane Juice. TERRY (C.) and Parker, 1838.

Pneumatic Process or improved method of expelling the molasses and syrup from raw sugar. CROSLEY, 1830.

Sugar (Practical) Planter. WRAY (L.), 1848.

Sugar Analysis, Manual. TUCKER (J. H.), 1881.

SUGAR (MACHINERY). BURGH (N. P.), 1863; STEWART (D.), 1886.

SUGAR (MANUFACTURE).

Handbook of Sugar boiling. STOHMANN, 1878.

Sugar-planter's Manual. EVANS (W. J.), 1847.

Sugar Refining. BEVAN (G. P.), Industries, vol. 12.

Theoretical and practical treatise. STAMMER (C.), 1875.

Brazil. MATTOS, 1882.

United States Sugar. UNITED States, p. 357.

SUGAR (BEET). PORTER (J. H.), 1870; WALKHOFF (L.), 1874

Manufacture in England and Ireland. CROOKES, 1870.

Cultivation of Sugar-beet in England. PORTER (J. H.), 1870, '74.

Use of the Beetroot. GIRARD (A.), 1887.

SUGAR CANE.

Cultivation of, for sale. DESMOND, &c., 1887.

Nature and properties. PORTER (G. R.), 1831.

Sugar Canes and their products. HEDGES, 1881.

Sugar from the cane and from beets. BOULIN, 1889.

Sugar growing and refining. LOCK, Wigner and Harland, 1882.

SUGAR INDUSTRY. Anonymous (1887), p. 56. British Sugar Industries and Foreign Export Duties. Ohlson, 1880.

SULPHUR.

Method of recovering, as practised at Dieuze, near Nancy. Bell (Sir I. L.), 1867, p. 119.

Royal Méjratu (Iceland) Sulphur Exploring Company. Cole (G. F.), 1875.

SUN. *See* Astronomy.

SUNDAY. Observance of the Lord's Day. Pearson (C.), 1855.

SURETYSHIP. Suretyship, dangers of private security. Saunderson (C.), 1844.

SURGEONS. Case of three Assistant Surgeons dismissed from the Bengal Establishment. India, 1890, p. 110.

SURGERY.

Antiseptic System. Use of Carbolic Acid. Sansom (A. E.), 1881.

Artificial Limbs and Amputations. Bigg (R. H.), 1885.

Deformities, Mechanical treatment of. Bigg (H. H.), 1865.

Spinal curvature. Bigg (R. H.), 1882.

Orthopragms of the Spine, curative mechanisms applicable to spinal curvature. Bigg (R. H.), 1880.

Ovariotomy. Correspondence with T. Spencer Wells. Jesse, 1882.

SURVEYING AND LEVELLING. Anonymous, 1846, p. 47; Balfour (D.), 1876; Bouquet de la Grye, 1879; Breton, 1873; Gillespie (W. M.), 1870; Pease (W.), 1847; Thomason Civil Engineering College, 1862–4.

Aid to Survey Practice. Jackson (L. d A.), 1880.

Arbitrations, a text book. Fletcher (B.), 1875.

Art of surveying and measuring of land. Love (J.), 1688.

Association of Surveyors of the Royal Engineer Establishment. Occasional Papers, July, 1894. Assoc. of Surveyors, etc. Add. 482.

Barometer, use of the. Cruls, 1888.

Colonial Surveying. Frome, 1850.

Compleat Surveyor. Leybourn, 1679.

Contour Lines, &c. "Hills and Dales." Maxwell (J. C.), 1870.

Contouring, New system of. Young (Capt. H. W.), 1866.

Curves. A Curve Book, methods of setting out Curves of Roads, Railways and Canals. Jackson (L. d'A.), 1870.

—— Laying out. Perronne, 1865.

Dilapidations, a text book. Fletcher (B.), 1883.

SURVEYING AND LEVELLING—*continued.*

Engineer's, Mining Surveyor's, and Contractor's Field Book. HASKOLL, 1880.

Engineering Field Notes on parish and railway surveying and levelling. CASTLE (H. J.), 1847.

Geodesy. CLARKE (A. R.), 1858; HARNESS (vol. 3), 1853. For the use of sailors. BÉGAT, 1839.

—— Association Géodésique Internationale. Reports of Conference. ASSOCIATION Géodésique, 1861–74; Assoc. Géodésique, 1867. Add. 482.

—— Geodesic junction of Algeria with Spain. PERRIER, 1879.

—— Practical Geodesy. WILLIAMS (J. Butler), 1846.

—— Problem of Geodesy. AIRY (Sir G. B.), 1850, p. 18.

—— Belgium. BRUSSELS, 1876.

Government Surveys of the principal countries, etc. Notes. PARLIAMENTARY..Papers, 1883. Add. 527.

Instructions for Civil and Military Surveyors in topographical plan-drawing, etc. SIBORN (Lieut. W.), 1822.

Instructions to Surveyors employed by the Postmasters-General under the Post and Road Acts. TAYLOR (Major), 1790.

Instruments (Surveying) and Surveying. LALL (K.), 1857; MIDDLETON (G. A. T.), 1894.

—— Electrical. WILKE, 1883.

Intercolonial Conference of Surveyors, 1892, Melbourne. INTERCOLONIAL Conf.

Land-measuring and levelling. BRIOT and Vacquant, 1887.

Land Surveying. BOHN, 1886; BRETON, 1865; GILLESPIE (W. M.), 1855, 1888.

—— By the chain, cross and offset staffs. DAVIS (W.), 1816.

—— On the Meridian and Perpendicular System. PENMAN (W.), 1885.

—— Complete System. SLEEMAN (T.), 1805.

—— Co-ordinate geometry applied to land surveying. MARQUARD (L.), 1882.

Land surveying and levelliug. DURAND-CLAYE, Pelletan and Lallemand, 1889.

Land Surveying. Every Farmer his own Land Surveyor. ANONYMOUS, 1856, p. 45.

—— Scale Field Book. LAMB and Llewelyn.

—— Treatises. DIX, 1819; GILLESPIE (W. M.), 1855. App. 559. NESBIT, 1847. Fieldbook, NESBIT, 1840.

Land engineering, trigonometrical, subterraneous, and marine surveying. BOURNS, 1843.

Land and Engineering Surveying. BAKER (T.), 1859, 1875.

Land and Engineering Surveying, Levelling, etc., Science of. MERRETT, 1863, '85.

SURVEYING AND LEVELLING—*continued.*

Land and Marine. HASKOLL, 1886.

Laying out of ground. MOINOT, 1877.

Levelling. DUPLESSIS, 1877 ; HOLLOWAY, 1887.

Levelling by vertical angles, and method of measuring distances by Telescope and Rod. FAUL, 1886.

Levelling necessary in the construction of Railways, Canals, &c. BRUN, 1860.

Levelling Operations, Hints on. WELLS (W. H.), 1879.

—— Application to purposes of Civil Engineering, especially in the construction of Roads. SIMMS (F. W.), 1837, 1856, 1884.

Manual of Surveying and Field-Sketching. FLOWER, 1859.

Marine. *See* HYDROGRAPHY.

Measurement of two Sections of the Meridional Arc of India. EVEREST (G.), 1847.

—— Rectification of Logarithmic errors in the measurement. EVEREST (G.), 1859.

Metropolitan Building Acts: a text book. FLETCHER (B.), 1882.

Military. DRAYSON, 1869 ; LENDY, 1869.

Ordnance Survey. PALMER (H. S.), 1873 ; WHITE (Col. T. P.), 1886.

—— Production of Maps. JAMES (Sir H.), 1875.

—— Catalogue of Maps and Plans. JAMES (Sir H.), 1863.

—— Triangulation, extension of, into France and Belgium. JAMES (Sir H.), 1863.

—— Reports, 1855, etc. PARLIAMENTARY..Papers, p. 494.

—— Correspondence respecting scale of Maps, 1854. PARLIAMENTARY..Papers, p. 494.

—— Returns of Counties and places of which Ordnance Maps have been issued, 1881. PARLIAMENTARY..Papers, p. 494.

—— Report of Committee on condition of the survey, 1893. Minute of Board of Agriculture, 1894. PARLIAMENTARY..Papers, p. 494.

—— Civil Assistants. Returns, 1877–90. Report on their position, 1892. PARLIAMENTARY..Papers, p. 494.

Ordnance Survey. Report on the Datum level of. BRITISH Association, 1879. Add. 488.

Photography applied to Surveying. REED (H. A.), 1888.

Practical hints for levelling. ANONYMOUS, 1865, p. 52.

Practical Surveying. HAMMOND (John), 1725; USILL (G. W.), 1889 ; HOLWELL, 1678.

Preliminary Survey and Estimates. GRIBBLE, 1891.

Problems and their solutions. JEANS (H. W.), 1849.

Quantities, a text book. FLETCHER (B.), 1888 ; LEANING, 1886.

SURVEYING AND LEVELLING—*continued.*

Railways. Treatise. QUESTED, 1846.

Spirit Levelling in England. Abstracts of the principal lines of, and Wales (Scotland, Ireland). JAMES (Sir H.), 1855–61.

Spring Level. Description of. DONKIN (B.), 1824.

Suppression of chains in levelling and the drawing of plans. LOIR, 1883.

Surveying (Subterraneous). FENWICK (T.), 1804, 1822, 1861.

Surveyor, Engineer and Architect. PERIODICAL PUBLICATIONS, p. 25.

Surveyor's main Road Account book. ANONYMOUS, 1880, p. 56.

Tacheometer. KREUTER, 1876, '88; SALMOIRAGHI (A.), 1884. (Wagner-Fennel). FENNEL (O.), 1887.

Tacheometer, Manual for the operator of. BONNAMI, 1883.

Tacheometrical Tables. SOLDATI, 1888.

Tacheometry. CARDERERA, 1877; GOULIER, 1892; PORRO, 1861; WERNER (C.), 1883.

Topographer, his instruments and methods. HAUPT (L. M.), 1883.

Topographic stadia. Application to making of plans connected with railways, canals, &c. MEYER (J.), 1885.

Topographical Surveying. JOHNSON (J. B.), 1885; WAUGH (Sir A. S.), 1861. Rapid methods in. DAWSON (W. B.), 1882.

Theory and Practice. JOHNSON (J. B.), 1886.

Transactions. ARKANSAS SOCIETY of Engineers, Architects and Surveyors, 1887.

Trigonometrical Levelling. PRONY, 1822.

Trigonometrical Survey, Method of conducting. FROME, 1840, '50, '73.

—— Island of Hokkaido, Japan. DAY (M. S.), 1876.

Trigonometrical Surveying, levelling and Railway Engineering. GALBRAITH (W.), 1842.

Underground Surveying. New instrument for. GARFORTH, 1880.

American (North) Boundary Commission. WILSON (Lieut.), 1864.

Asia. Surveys and other scientific inquiries instituted by the Hon. East India Company throughout Asia. JERVIS (T. B.), 1838.

Australia (Western). Reorganisation of the Survey Department. WESTERN AUSTRALIA, 1871, p. 423.

Australia (South). Surveyor-General's Report on Survey of Northern Territory. SOUTH AUSTRALIA, 1869, p. 229.

Bavaria. BAUERNFEIND, 1884.

SURVEYING AND LEVELLING—*continued.*

Belgium. Measure of Belgian geodesic bases. BELGIUM, 1855, p. 118.

—— Base Levelling. BRUSSELS, 1879.

—— Triangulation of the Kingdom of Belgium. BELGIUM, 1867; BRUSSELS, 1867–78.

Canada. Report of Surveys made of Lakes Manitoba and Winnipegoosis, the Waterhen River and Little Saskatchawan River. MANITOBA, 1878.

Ceylon. Report of Surveyor-general, 1891. INDIA, p. 117.

France, 1864, 1889. FRANCE, p. 440.

France, Switzerland. BAUDOT, 1874.

Great Britain. Trigonometrical Survey, 1801–9. MUDGE and Colby, 1811.

—— England and Wales. MUDGE and Dalby, 1779–1801.

—— Trigonometrical Survey of Great Britain. Experiments for determining the variation in the length of the pendulum vibrating seconds. KATER, 1819.

—— Ordnance Trigonometrical Survey of Great Britain and Ireland. Observations and Calculations of the principal triangulation. CLARKE (A. R.), 1858.

—— Determination of the positions of Feaghmain and Haverfordwest. CLARKE (A. R.), 1867.

India. Memoir on Indian Surveys. MARKHAM, 1871, '78.

—— Methods of reduction applicable to the Indian Survey. AIRY (Sir G. B.), 1864, p. 18.

—— Revenue Survey Operations in the Lower Provinces, 1856–78. INDIA, p. 107.

—— Reports of the Trigonometrical, Topographical and Revenue Surveys, 1867–68. INDIA, p. 108.

—— Survey Settlement into twenty-one villages of the Sirsi Táluka of the Kanara Collectorate, 1855. INDIA, p. 120.

—— Surveying for India. Manual. THUILLIER (Col. H. L.) and Smyth, 1875.

—— Great Trigonometrical Survey. On the methods of determining heights in. WALKER (Col. J. T.), 1864.

—— —— Account, 1870–90. INDIA, p. 107.

—— —— Reports, 1871–79. INDIA, p. 107.

—— —— Spirit-levelled Heights in Cutch, Kattywar, Guzerat, Tanna and Bombay Districts, 1879. Madras, 1869–89. Southern India, 1869–70. INDIA, p. 107.

—— —— Tables of Height. Bengal, 1866, 72. North West Provinces, 1863, '66, '69, '72. Oudh, 1869. Punjab, 1863, '69. Sind, 1863. INDIA, p. 108.

SURVEYING AND LEVELLING—*continued.*

Ireland. Lough Foyle Base. Account of the measurement of, with its verification and extension by triangulation, etc.
YOLLAND (W.), 1847.

—— Parish of Templemore, Londonderry. COLBY, 1837.

—— Principal Lines of Spirit Levelling in Ireland.
COLBY, 1855.

Mossel Bay and Oudtshoorn Railway Survey. Report.
SPINDLER (H. L.), 1879.

New South Wales. Base line for Triangulation. Reports, 1871.
NEW SOUTH WALES, p. 404.

New York State. Report of Commissioners, 1875–85.
NEW YORK STATE.

—— Final Results of the Triangulation, 1887.
NEW YORK STATE.

—— Longitude of the Western Boundary Line, 1868.
NEW YORK STATE.

New Zealand. Reports on Surveys, 1873–87.
NEW ZEALAND, pp. 412–413.

—— Survey from Canterbury to West Coast, 1878.
NEW ZEALAND, p. 413.

—— Regulations and Instructions of the Survey Department, 1886. NEW ZEALAND, p. 413.

Palestine, Western, Survey of. HULL (E.), 1886. Add. 509.

Pegu. Central and Northern portions of Pegu. Survey Reports, 1856. INDIA, p. 128.

Queensland. Trial Railways and other Surveys. Expenditure.
QUEENSLAND, 1879, p. 74

Santo Domingo, Survey Journey in. WELLS (J. W.), 1893.

Scotland. Coast and Central Highlands. Survey and Report.
TELFORD (T.), 1803, p. 288.

—— Mineral Survey along the track of the Canal betwixt Edinburgh and Glasgow. BALD (R.), 1814.

—— Ordnance Survey. DOULL, 1853.

—— Survey of the different lines for a canal between Edinburgh and Glasgow. RENNIE (J.), 1797.

Switzerland. Spirit-levelling of Switzerland.
HIRSCH and Plantamour, 1883.

Sydney Triangulation. Report on City and County Survey.
SYDNEY, 1882, p. 273.

United States. Coast Survey. BACHE, 1844–50.

—— Surveys. Geological Surveys, etc.
UNITED States, 1896, &c., pp. 345–6.

—— Manual of Topographic methods.
GANNETT (H.), 1893. Add. 502.

SURVEYING AND LEVELLING—*continued.*

United States. United States Lake Survey, Primary Triangulation of. COMSTOCK, 1882.

—— Boston, Mass. Annual Reports of the Board of Survey, 1893, etc. BOSTON.

Victoria Surveys, Expense of. VICTORIA, 1859, p. 378.

Yesso Trigonometrical Survey. A preliminary report of the survey of Hokkaido. WASSON (J. R.), 1874.

SWORDS AND BAYONETS. Report of Committee on Cutlasses and Cutlass Sword Bayonets supplied to the Royal Navy, 1887. Minutes of Evidence. Observations on Report. PARLIAMENTARY..Papers, p. 489.

T.

TABLES.

Aberration and Nutation, new tables of. ZACH (F. X.), 1812.

Analytical Tables for use in Laboratory School of Military Engineering. INGRAM, 1870.

Arcs, Circular, Tables of, in terms of radius calculated to twelve places of decimals. BEAZELEY, 1869.

Arts and Sciences, Tables and tracts relating to several. FERGUSON (J.), 1771. App. 557.

Astronomical, Meteorological, and Magnetical. BOILEAU (J. T.), 1850.

Auxiliary Tables. SCHUMACHER (H. C.), 1822.

Canal and Culvert Tables based on the formula of Kutter. JACKSON (L. d'A.), 1878.

Capital Tables, introduction and withdrawal of, 1871 to 1892 inclusive, for each of the seven colonies and the whole of Australasia. NEW SOUTH WALES. Add. 522.

Continental Lineal and Square Measures. WOOLHOUSE (W. S. B.), 1836.

Curves. Tables of Tangential angles and multiples for setting out curves from 5 to 200 radius. BEAZELEY, 1865.

—— Tables for setting out Curves from 101 feet to 5,000 feet radius. CUTLER and Edge, 1885.

Decimal quotients, first centenary of Tables of all the complete. GOODWYN, 1818.

Diameters, Tables of, and Thicknesses of Wrought Iron and Steel tubes. HOWELL and Co., 1891.

Distances, Table of, at which objects can be seen at sea. CARRINGTON (R. C.), 1875.

Electrical tables and formulas. CLARK (L.) and Sabine, 1871. Tables and Memoranda. THOMPSON (S. P.) and Thomas, 1893.

Engineers. Formulas, tables and practical information. Aide-mémoire for engineers. CLAUDEL, 1860.

—— Tables for the use of engineers. GENIEYS, 1835.

—— Spon's Tables and Memoranda for Engineers. HURST, 1885.

Equation tables for adjusting watches and clocks to the motion of the sun. ANONYMOUS, 1731. App. 544.

Estates, Tables for the purchasing of. INWOOD, 1880.

Ex-meridian Altitudes, Tables for the reduction of. TOWSON (J. T.), 1849.

Graphic tables or Diagrams for the conversion of measurements in different units. SMITH (Robert H.), 1895. Add. 534.

TABLES—*continued.*

Grecian, Roman, and Jewish Measures, weights and coins reduced to the English Standard. ARBUTHNOTT (J.), 1700. App. 545.

Haversines, natural and logarithmic. HANNYNGTON, 1876.

Horary Tables, Supplement to, 1827. LYNN.

Hydraulic Tables, co-efficients and formulas. NEVILLE (J.), 1853, 60–61.

Hydraulic and other Tables for purposes of Sewerage and Water Supply. HENNELL, 1884.

Integral Tables. HIRSCH, 1823.

Interpolation Tables, used in the Nautical Almanac Office. GODWARD, 1857.

Iron, Wrought. Tables of the weight of square, round, and flat. YORK (J. O.), 1832.

Land. Tables of local land, square and solid measures converted into statute measure. HALL (W. S.), 1832.

—— Tables showing the required Length of a Plot of Land of any given width from 1 foot to 100. WYLSON (J.), 1850.

Latitudes and Longitudes. LYNN, 1824.

Logarithms. SOCIETY for the Diffusion of Knowledge, 1839. Of compound interest and Annuities (Thoman's). INWOOD, 1880.

—— Patent Logarithmic Co-ordinate Sheets. HUMAN, 1894.

—— Five-figure Logarithms. WOODWARD (C. J.), 1893.

—— To six places. RAPER, 1846.

—— To seven places of decimals. LALANDE, 1836.

—— To twelve decimals. NAMUR (A.), 1877.

Mariner's compass rectified; horary Tables. WAKELEY (A.), 1759.

Mathematical Tables. LAW and Young, 1879.

—— For trigonometrical, astronomical and nautical calculations. LAW, 1884.

—— Sherwin's Mathematical Tables, with Wallis's account of Logarithms and table of Logarithms from 1 to 101000. SHERWIN (H.), 1771. App. 576.

Metrical Tables. MOLESWORTH, 1880.

—— British Standard Measures and Weights compared with those of the metric system on the Continent. DOWLING, 1864.

—— For converting French metres and decimetres into English feet and fathoms. CARRINGTON (R. C.), 1865, 1871.

Mines. Tables for use of persons employed in. WHITBURN (W.), 1832.

Moon, Tables of the. HANSEN (P. A.), 1857.

Nautical Tables. NORIE, 1836.

Navigation and Nautical Astronomy. LAW and Young, 1879; YOUNG (J. R.), 1859.

Physico-Chemical Tables. LANDOLT and Bornstein, 1883.

TABLES—*continued.*

Ready reckoner. CRELLE, 1880.

Reciprocals, Table of the, of numbers from 1 to 100,000. OAKES, 1865.

Revenue officers of the United States, Tables to be used by. M'CULLOH, 1849.

Scales, Natural. Showing the proportion which the space representing a mile on a chart or map bears to the actual mile on the earth's surface. CARRINGTON (R. C.), 1877.

Sexagesimal Table. TAYLOR (M.), 1780.

Sines, Natural Versed, from 0° to 125°, and logarithmic Versed Sines from 0° to 135°. HIND (J. R.), 1856.

Specific gravities of all substances. HAVILAND (J.), 1846.

Spheroidal tables showing the length in feet of a degree, minute and second of latitude and longitude. CARRINGTON (R. C.), 1876.

Steam Tables and Engine Constants. PRAY (T. W.), 1894. Add. 529.

Surveying, geodesy and practical astronomy. Tables and Formulas useful in. LEE (T. J.), 1853, '73.

Swedish money, weights and measures. Conversion tables. JÖRANSON (C. L.), 1777.

Tide Tables for English and Irish Ports. ADMIRALTY, 1843–59. Add. 479.

—— For the English and Irish Channels, and the River Thames for 1838. ADMIRALTY. Add. 479.

—— For the British and Irish Ports. HARRIS (H. R.), 1881.

Tonnage Table for Canada. ANONYMOUS, 1790, p. 57.

Transit Tables for 1883–87. CLARK (L.).

Traverse Tables. BOILEAU (J. T.), 1839; CRELLIN, 1881.

Trigonometrical solutions of right angle plane triangles computed on the logarithmic number 2,000,000. BOUCHETTE, 1827.

Useful Rules and Tables. NOBLE (W. H.), 1882.

TACHEOMETRY. *See* SURVEYING.

TANKS.

Practical Tank builder. D'ROZARIO, 1869.

Repairs to Tanks. ANONYMOUS, 1856, p. 49.

TAPESTRY making and Embroidery. COLE (A. S.), 1886.

TARIFFS. ITZELES, 1883.

Australasia. Comparative table of tariffs of New South Wales, Victoria, South Australia, Queensland and Tasmania. DUNCAN (W. A.), 1876.

Board of Trade Journal of Tariff and Trade Notices. PERIODICAL PUBLICATIONS, p. 12.

TARIFFS—*continued.*

European and United States Tariffs. Wolverhampton Chamber of Commerce. British Exports, 1840–78. Imports, 1855–78. WOLVERHAMPTON, 1879.

Why Tariffs are not maintained. ANONYMOUS, 1881, p. 58.

TAXATION.

Income Tax. How to raise Millions by State Canals and remove the Income Tax. PRINSEP (E. A.), 1870.

Proposals for an equitable reform in Taxation and Finance. CUNDY, 1832.

Scheme to secure and extend the Credit and Strength of the British Nation. ANONYMOUS, 1742, p. 55.

Taxation, Principles of. SMITH (Jo. Toulmin), 1849.

—— With reference to a property tax. BABBAGE (C.), 1853.

TAXATION (LOCAL).

Ireland. Returns. IRELAND, p. 141.

London. Exemption from Poor Rates. St. Andrew's, Holborn. GRIFFITH (E.), 1831.

Rating of Machinery and Railways. HEDLEY (T. F.), 1883.

Report of Poor Law Commissioners, 1844. Annual Local Taxation Returns, 1889–90. Returns relating to the Local Taxation and Technical Education Acts, 1890–92. PARLIAMENTARY..Papers, p. 516.

TEA.

India. Cultivation of the Tea Plant, 1839. INDIA, p. 108.

Punjab Provinces. Tea Plantations, 1859. INDIA, p. 130.

TECHNICAL INSTRUCTION. GALBRAITH (J.), 1892; INGLIS (J. C.), 1880; MERIVALE, 1885; PHILIPSON (J.), 1890; ROBINS (E. C.), 1886; SMITH (Robert H.), 1890.

Chemical instruction, provision of, to meet scientific and technical requirements. ERLENMEYER (E.), 1871.

College, Technical, Needs and Opportunities of a. THURSTON (R. H.), 1894, p. 310.

Conference on Technical Education, 1868. ROYAL Scottish Soc. of Arts

Geology as a branch of Technical Education. CADELL (H. M.), 1887. Add. 489.

Higher Technical Instruction. ARMSTRONG (G. F.), 1885.

Mechanic's art abroad and at home. SELLERS (C.), 1884.

Samuelson's, B., letter on Technical Education in various countries abroad, 1867. PARLIAMENTARY..Papers, p. 475.

School (Technical) and College Building, with chapter on Technical Education. ROBINS (E. C.), 1887.

TECHNICAL INSTRUCTION—*continued.*

Schools, particularly Trade Schools. WILSON (Joseph M.), 1890.
Thoughts and Suggestions. EGLESTON, 1888.
What it is. BURNS (W.), 1888.

England. Systematic Technical Education for the English people. RUSSELL (John S.), 1869.
—— Letters in answer to queries of the Vice-President of the Council, 1868. PARLIAMENTARY..Papers, p. 476.
—— Technical and Primary Education. Circular of Lord Stanley to H.M.'s Representatives abroad, 1868. PARLIAMENTARY..Papers, p. 476.
—— Reports of the Royal Commissions on Technical Instruction, 1882–84. PARLIAMENTARY..Papers, p. 476.
Europe, Technical Instruction in. DAHLANDER, 1866.
Europe and America. Technical Schools. GROTHE (H.), 1882.
France. FRANCE, 1865, p. 436.
France, Belgium and Switzerland. LEKVE, 1881.
Germany, Higher Technical Instruction in. CUYPER, 1875.
—— Technical Instruction in Germany and Switzerland. GERMANY, 1869.
Glasgow and the West of Scotland. DYER (H.), 1893.
Holland. Development of higher technical university education in Holland. HUET, 1883, '89.
Italy and other countries. Technical, Industrial, and Professional Instruction in. LEVI, 1867.
Lancashire. Report of the Director of Technical Instruction. LANCASTER, 1893.
Liverpool. HELE-SHAW, 1887.
London. City and Guilds of London Institute. Programmes. CITY and Guilds, 1884–86.
—— Report, 1891, and Programmes, 1873–1894. CITY and Guilds. Add. 492.
—— County Council. Report of the Technical Education Board for the year 1893–4. LONDON. Add. 516.
New South Wales. Report of Board for 1888. NEW SOUTH WALES, 1889, p. 401.
Scotland. Technical Schools Act, 1887. DYER (H.), 1887.
Sydney Technical College. Prize distribution and address and the Suburban and Provincial Technical Schools. SYDNEY, 1888, '89, p. 274.

See also EDUCATION.

TECHNICAL TERMS. Misuse of. Rotation and Revolution. PERIGAL (H.), 1849.

TECHNOLOGY.

Character of the technical revolution of the 19th century. KELLER (K.), 1892.

Massachusetts Institute of Technology. Proceedings, 1884–85, etc. Catalogue of Officers and Students, 1886–7. Account, 1893. President's Reports, 1873, etc. MASSACHUSETTS Institute.

Position of German Technologists in State and social life. WEBER (M. M. von), 1877.

Technological Terminology. KESSELS, 1864.

TELEGRAPH. For day and night signals. GUYOT, 1840; PASLEY, 1823.

TELEGRAPH (ELECTRIC). BEECHEY (F. S.), 1881; BEVAN (G. P.). Industries, vol. 10; FAHIE, 1883, 1884; GALVÃO, 1869; GRAETZ, 1883; LARDNER, 1855, '67; LOCKWOOD (T. D.), 1883; LONDON and N. W. Rly., 1849. Add. 516; PREECE and Sivewright, 1876, 1892; PRESCOTT, 1878; SABINE (R.), 1867; SIEMENS (W. von), 1850; THOMAS (H.), 1894.

Advances, Recent, in Telegraphy. PREECE, 1879.

Aerial Telegraph. BONTEMPS, 1876.

Annalen. BRIX, 1872.

Annales télégraphiques. PERIODICAL PUBLICATIONS, p. 11.

Apparatus, Telegraph, Report. Paris Exhibition, 1867. SABINE (R.), 1867.

Apparatus and systems. MERCADIER, 1883.

Application of acoustic, optical, electric, and maritime Telegraphy to Navigation and Meteorology. MARCOARTU, 1873.

Archiv für Post und Telegraphie. PERIODICAL PUBLICATIONS, p. 11.

Authorship of Electric Telegraph, or the Brunel award vindicated. COOKE (Rev. T. F.), 1868.

Bill. Electric Telegraphy Company Bill. Petition against Committee on. BAIN (A.), 1846.

—— Electric Telegraphs Bill. Government and the Telegraphs. GRIMSTON (R.), 1868.

—— Report and Proceedings of Select Committee on the Electric Telegraphs Bill, 1868. PARLIAMENTARY..Papers, p. 517.

—— Report from Select Committee on the Telegraphs Acts Extension Bill, 1870. PARLIAMENTARY..Papers, p. 517.

Coast Telegraph Communication with lighthouses, lightships, etc. BENEST, 1892.

Code, Telegraph, for 1878. BOLTON (Sir F.) and Sivewright.

Companies, Names of, incorporated for Telegraphic Communication, 1860. PARLIAMENTARY..Papers, p. 517.

TELEGRAPH (ELECTRIC)—*continued.*

Compendium, Electric Telegraph. WEIDENBACH (L.), 1881.
Conductors, Telegraphic. India-rubber as an insulator. HOOPER, 1865.
Construction and maintenance of Telegraph Lines. CULLEY, 1869.
—— Manual of Telegraph Construction. DOUGLAS (J. C.), 1875.
Construction of Telegraphic Lines. JENKIN, 1863.
Converser, patent electro-telegraphic. BRETT (R. H.) and Little, 1847.
Correspondence, 1868. PARLIAMENTARY . . Papers, p. 517.
Cowper-Robertson Writing Telegraph. Report of Committee, 1889. FRANKLIN Institute.
Description of an Electrical Telegraph. RONALDS (Sir F.), 1823.
Delany Synchronous Multiplex Telegraph System. STANDARD Electric Manufac. Co., 1883.
Dictionary (Telegraphic), of the English Language. BOLTON (Sir F.), 1871.
Duplex System; theory and practice. PEGOT (J.), 1892.
Economy and efficiency. NICOLL, 1887.
Engineering Telegraph Code. BLACKBURN (A. H.) and Stevens, 1892.
Error (Sources of), in Practical Telegraphy. ANDERSON (Sir J.).
Galvanic and electro-magnetic Telegraph, Introduction of the. HAMEL (J.), 1858.
Guide. MIÉGE, 1865.
Handbook of Practical Telegraphy. CULLEY, 1863, '71, '85; ZETZSCHE (K. E.), 1877–87.
Head's (Sir F.) description, 1849. LONDON and North Western Railway, p. 276.
Heroes of the Telegraph. MUNRO (J.), 1891.
History. ANONYMOUS, p. 46.
History of Telegraphy from ancient times to the present. BELLOC, 1888.
History and progress. HIGHTON, 1852; JONES (A.), 1852; MOIGNO.
History of the Invention. TURNBULL and Highton, 1853.
History, theory, and practical application. ADLEY, 1854; PRESCOTT, 1860.
House Telegraph. SCHARNWEBER (L.), 1880.
House and hotel Telegraphy. CANTER, 1883, 1889.
Improvements in telegraphs. BRETT (R. H.), and Little, 1847; WINDOW (F. R.), 1854.
Induction by means of coils, telegraphic communication by. STEVENSON (C. A.), 1894.

TELEGRAPH (ELECTRIC)—*continued.*

Inland and submarine Telegraphy. ALLEN (T.), 1858.

Law of International Telegraphic communication. MADSEN, 1877.

Lecture. WEBB (E. M.), 1888.

Magnetic Telegraph. MORSE (S. F. B.), 1884.

—— Original Electro-magnetic Telegraph; plan and description. ALEXANDER (W.), 1851.

—— Electro-magnetic Printing Telegraph. Vindication of Bain's claim to be first inventor of. FINLAISON, 1843; FINLAISON, 1843. App. 557.

—— Electro-Magnetic Telegraph. SCHELLEN, 1867; TURNBULL (L.), 1853.

Maintenance and efficiency of Telegraphic Lines. JENKIN, 1863.

Manipulation. WALKER (C. V.), 1850.

Manuals. BOND (R.), 1864; SHAFFNER (T. P.), 1867; SWIFT (J. A.), 1883; WILLIAMS (W.), 1885.

Military Telegraphy. ANONYMOUS, 1877, p. 54; FISCHER-TREUENFELD, 1879; WAUWERMANS (H.), 1869.

Mining and General Telegraphic Code. MCNIELL, 1893.

Morse Apparatus. HOUZEAU, 1874.

—— How to learn the Morse Alphabet. MORSE (S. F. B.), 1876.

Multiplex telegraphy. GRANFELD, 1884.

Naval, military, and political Telegraphic Communication. MACDONALD (J.), 1808.

Occulting Telegraph, Babbage's. BABBAGE (H. P.), 1889, 1890.

Originator of the Electric Telegraph. ANONYMOUS, 1870, p. 51.

Postal Telegraph Service. LINES, 1883.

Practical Telegraphist. LYND, 1884.

Practice (Modern). POPE (F. L.), 1874.

Preservation of telegraphic posts. HERWATH, 1878.

Progress of the Telegraph. WILSON (G.), 1859.

Quadruplex System. MAVER and Davis, 1885.

Railway and Commercial Telegraphy. ABERNETHY (J. P.), 1887.

Rating of Telegraph Property. MAGNETIC Telegraph.

Return of the names of Railway Companies in the United Kingdom who construct or use Electric Telegraphs, 1868. PARLIAMENTARY..Papers, p. 517.

Return of Railway Companies who have or have not agreed to a limitation of the number of telegrams which they send free over the Postal Telegraphs from 1871. PARLIAMENTARY..Papers, p. 517.

Siemens. Telegraphic Apparatus of Mr. Siemens, of Berlin. POUILLET, 1850.

Simultaneously transmitted Telegrams in opposite directions upon the same wire. ROSENBUSCH (E.), 1874.

TELEGRAPH (ELECTRIC)—*continued.*

Statistics of Telegraphy. ANDERSON (SIR J.), 1872.
Steno-telegraphy. CASSAGNES, 1884, 1886; DESPLEISSIS, 1886.
System of Telegraphy. PREECE, 1873.
Telegraphic business at the present time. SACK (J.), 1883.
Telegraphs, past and present. JOGG (W.), 1878.
Telotype, the. A printing Electric Telegraph. GALTON (F.), 1850.
Testing Telegraph Lines, Instructions for. SCHWENDLER (L.), 1878.
Theory and practice. DU MONCEL, 1864.
Underground *versus* Overhead Wires. NICOLL, 1887.
Universal Private Telegraph Co. Wheatstone's Patents. WHEATSTONE (Sir C.), 1861.
Use of, in the field. OLMETA, 1872.
Watson, Bishop, and the Electric Telegraph. HAMEL (J.), 1861.
Wheatstone, Was it invented by? Pamphlet and replies. COOKE (Sir W. F.), 1854, '55, '56, '66.
Wheatstone Automatic Telegraph. MAVER and Davis, 1885.
Writing Telegraph. With samples of writing. COWPER, 1879.

Abyssinia, Telegraphic Material used during the expedition to. ST. JOHN (Lieut. O.), 1868.
Adelaide and Port Darwin line. ADELAIDE, 1871.
Alexandria, Port of. ALEXANDRIA, 1881.
America, Telegraph in. REID (T. D.), 1879.
American Electro-Magnetic Telegraph. Exposure of C. T. Jackson's pretension to the invention. KENDALL, 1852.
Australia, South. Overland Telegraph. Instruction to overseer, 1871. Reports, 1867, '71. SOUTH AUSTRALIA, p. 229.
Australian Colonies, Correspondence relative to the establishment of electro-telegraphic communication between, and Europe. AUSTRALIA, 1854, '56, '58, '69. Add. 482 and 3.
Berlin. International Telegraph Convention, 1885. BRASHER.
England. Account showing the gross Amount received and expended on account of the Telegraph Service, 1879. PARLIAMENTARY..Papers, p. 517.
France. Legislation. COTELLE, 1859–62.
France and abroad. Lines, apparatus, etc. MONTILLOT, 1889.
German State Telegraphs. MÜLLER (E.), 1890.
Holland. Annual Reports, 1855–78. HOLLAND.
India, British. Anglo-Indian Telegraphs. ADLEY, 1854, 1866; O'SHAUGHNESSY, 1853.
—— Telegraphic communication between India, Singapore, and Australia, 1864–68 INDIA, p. 108
—— Construction Code, 1885. INDIA, p. 108.
—— Electric Telegraph Department. Report, 1855–56. INDIA, p. 108.

TELEGRAPH (ELECTRIC)—*continued.*

India, British. Indo-European Telegraph Department. Reports, 1881, '87, etc. INDIA, p. 108.

—— Diagrams of Construction Stores, 1885. INDIA, p. 108.

—— Distribution Return of Lines and Offices, 1886, etc. INDIA, p. 108.

—— New overland line from India to Europe through Central Asia. PITMAN (C. E.), 1885.

—— Official Papers, 1855–70. INDIA, p. 108.

—— Reports, 1855. INDIA, p. 108.

—— Telegraph Routes to India. ANDERSON (Sir J.), 1886.

London. International Telegraph Convention, 1879. BRASHER; INTERNATIONAL Tel. Conv.

—— Inprovements in the system of the London and North Western Railway. CLARK (E.), 1854.

—— Electric Telegraphs under the Control of the Post Office. ANONYMOUS, 1868, p. 53.

—— General Post Office Telegraphs. Technical Instruction, 1880–84. PARLIAMENTARY..Papers, p. 517.

—— —— Report on the Organisation and financial system PARLIAMENTARY..Papers, 1876. Add. 526.

—— Report on proposals for transferring to the Post Office the control and management of the Electric Telegraphs throughout the United Kingdom, 1866–68. PARLIAMENTARY..Papers, p. 517.

—— Return of amounts paid by the Post Office to Telegraph Companies for the purchase of their interests, 1873. PARLIAMENTARY..Papers, p. 517.

Madras. Report of Telegraph Department, 1859–60. INDIA, p. 125.

Postal Telegraph and Cable Company, New York. POSTAL Telegraph, 1883.

New Zealand Telegraph Department. CANTERBURY, N.Z.

—— Shortland and Tauranga Telegraph. NEW ZEALAND, 1871, p. 413.

—— Telegraphs Department. Report, 1871. NEW ZEALAND, p. 413.

—— Second Cook Straight Cable, 1876. NEW ZEALAND, p. 413.

Ohio. Annual Reports of the Commissioners of Telegraphs, 1867–77. OHIO. Add. 524.

Petersburgh. International Telegraph Convention, 1875. BRASHER.

Prussia. Telegraph in war. BUCHHOLTZ, 1877.

Queensland. Report. QUEENSLAND, 1871–76, p. 74.

—— Overland Telegraphs. QUEENSLAND, 1871, p. 74.

Rome. International Telegraph Convention, 1872. BRASHER.

TELEGRAPH (ELECTRIC)—*continued.*

Turkey. Map of the Telegraph Lines of the Ottoman Empire. BIDDULPH, 1860.

—— Line between Constantinople and Bassorah. BIDDULPH, 1860.

United States. Telegraphs and Telephones. Report on Statistics. SHUMAN (A. E.), 1883.

Victoria. Report of Superintendent, 1856–61. VICTORIA, p. 378.

—— Telegraph Stations. Return of Working Expenses and Revenue. VICTORIA, 1860, p. 379.

TELEGRAPH CABLES.

Deep Sea soundings in connection with Submarine Telegraphy. STALLIBRASS (E.), 1887.

Deposit of Submarine Cables. WOOLHOUSE (W. S. B.), 1860.

Insulation. ANONYMOUS, 1860, p. 47.

Laying and repairing. HOSKIÆR, 1878; JAMIESON (Andrew), 1881. New process. LANDI and Falconieri, 1870.

Lecture. WEST (C.), 1861.

Mechanical conditions of the deposit. AIRY (Sir G. B.), 1858, p. 20.

Oceanic Electric Telegraph. Origin and progress. BRETT (J. W.), 1858.

Outlines of the principles, etc., involved in dealing with their electrical conditions. SIEMENS (Werner von and Sir W.), 1860.

Propagation of the Electric Current in long submarine Telegraph Cables. CLARK (L.), 1861.

Rise and extension. SMITH (Willoughby), 1891.

Ship Electric Telegraph Company. Description. SHIP Electric Telegraph Co., 1879.

Starting point of Submarine Telegraphy. SABINE (R.), 1876.

Submarine Telegraphy. DELAMARCHE, 1858.

—— Treatise. HOOPER, 1862; WÜNSCHENDORFF (E.), 1888.

—— Method of coiling Submarine Telegraph Cables. HEATH (L. G.), 1859.

—— Report on the construction of Submarine Telegraph Cables, 1861. PARLIAMENTARY..Papers, p. 517.

Terra-voltaic couple, application of a. BEARDMORE (S.), 1860.

African tropics, Cable-laying in the. CROUCH, 1887.

American, Central and South, Cable Expedition. Spanish Cable Expedition Soundings. CENTRAL and South American, 1881–86.

American (South). Repairs, 1893. INDIA RUBBER, etc., Co. Add. 510.

TELEGRAPH CABLES—*continued.*

Atlantic Cable. AIRY (Sir G. B.), 1856, p. 16; FAIRBAIRN (Sir W.), 1866, p. 403; FIELD (C. W.), 1856; GRAVATT, 1858; MATTHYS, 1860; RUSSELL (W. H.), 1865.

Atlantic Telegraph Company. Reports. ATLANTIC TELEGRAPH COMPANY, 1858, 1864.

—— History. ANONYMOUS, 1857, p. 40; ATLANTIC TELEGRAPH COMPANY, 1857.

Atlantic and South Atlantic. ANONYMOUS, 1859, p. 40; WINDOW (F. R.), 1859.

Brazilian, Western and, Cables Expedition, 1891. INDIA RUBBER, etc., Company.

Bushire and Fao, Report on laying down the submarine cable between. STEWART (Lt.-Col. P.), 1864. Add. 535.

—— Report on Operations of picking up and repairing. WEBB (F. C.), 1864.

Channel, Mid, Telegraph stations proposed. BARROW (K.), 1869.

Congo. Repairs, 1887. INDIA Rubber, etc., Company.

Dover and Calais, first Cable between, 1851. NEWALL (R. S.).

Dunwich to Zandvoort. Glass *v.* Boswall, damage to telegraph Cable, arguments for new trial, 1861. GLASS.

Europe, Telegraphic submarine lines between, and America and the Atlantic and Pacific. MARCOARTU, 1863.

Falmouth and Gibraltar Cable. Transfer of the cable to a line from Rangoon to Singapore. FALMOUTH, 1860.

French Government, Correspondence respecting the recent Convention between the Submarine Telegraph Company and the, 1859. PARLIAMENTARY..Papers, p. 516.

Globe Telegraph. BEARDMORE (S.), 1859.

Gwadur and Kurrachee. Report on operations of laying down. WEBB (F. C.), 1864.

Gwadur and Ras Moaree, Report on laying down the submarine cable between. STEWART (Lt.-Col. P.), 1864. Add. 535.

Halifax and Bermuda. Submarine Telegraph. HALIFAX, 1889.

India, Ocean Telegraph to. PARKINSON (J. C.), 1870.

—— Establishment of Telegraphic Communication in the Mediterranean and with India. MEDITERRANEAN Sea, 1858–60.

New York, Newfoundland and London Telegraph Company. 25th anniversary, March 10, 1879. NEW YORK, Newfoundland, etc. Add. 523.

Persian Gulf Telegraph Cable. Reports on first cable. ESSELBACH (E.), 1862. Add. 499; FORDE (H. C.), and Jenkin, 1862. Add. 501; SIEMENS (Werner von), and Siemens, 1862. Add. 533; THOMPSON (Sir W.), 1862. Add. 536; VARLEY (C. F.), 1862.

—— Report as to Staff and Ships employed in laying the second cable. CHAMPAIN (J. U.), 1869. Add. 491; CLARK (L.), 1869. Add. 492.

TELEGRAPH CABLES—*continued.*

Red Sea and India Company. Correspondence on the contracts entered into by the, for laying down telegraph, 1860. PARLIAMENTARY .. Papers, p. 516.

Spanish National Cables, 1883–84. INDIA Rubber, etc. Company.

Tenerife Coast, 1886. INDIA Rubber, etc. Company.

United States (Direct) Cable Company. Reports. THOMSON (Sir W.), Bramwell, etc., 1876.

—— Report on tests taken at Ballinskelligs Bay Station. THOMSON (Sir William), 1875.

—— Report in relation to the landing of foreign telegraph cables on the shores of the United States. UNITED States, 1885, p. 357.

Victoria, Cape Otway and Tasmania, Submarine Telegraphic connection between. VICTORIA, 1858, p. 379.

Yof-Dakar Underground Cables. BRIGHT (C.), 1893.

TELEGRAPH CABLES (TESTS).

Correspondence on the subject of protecting from injury Submarine Cables and vessels laying and repairing them, 1882. PARLIAMENTARY..Papers, p. 517.

Electric testing. HOSKIÆR, 1879.

TELEPHONES. ANONYMOUS, 1883, p. 40; BRAMWELL, 1883; DU MONCEL, 1879, '87; FIGUIER, 1885; GRAETZ, 1883; HOFFMANN, 1878; MOURLON, 1887; NIAUDET, 1878; PREECE and Stubbs, 1893; PREECE and Maier, 1889, in French, 1891; TEGG (W.), 1878; UHLAND, 1881.

Cities (Great) Telephoning of. BENNETT (A. B.), 1893

Companies (Telephone) and the Post Office. GENERAL Post Office, 1884.

Different systems. ANONYMOUS, 1882, p. 44.

Economy and efficiency. NICOLL, 1887.

Floating Telegraph Stations, system of. HARDING (C. W.), 1883.

French Telephone lines. ARMENGAUD (C.), 1881.

Handbook (Telephone) and Guide to the Telephone Exchange. POOLE, 1891.

Historic notes. FAHIE, 1883

How to make it. DOLBEAR, 1878.

Industrial Telephone. WIETLISBACH (V.), 1889.

Mechanical transmission of Sound by Wires and forms of Microphone receivers. MILLAR (W. J.), 1880.

Microphone and Radiophone. SCHWARTZE (T.), 1883, 1885, p. 172.

Practical Information for Telephonists. LOCKWOOD (T. D.), 1882.

Speaking Telephone. PRESCOTT, 1879.

TELEPHONES—*continued.*

Submarine Cables for long distance telephony. PREECE, 1890.

Traffic, use on lines of small. POLLITT, 1892.

France. MONTILLOT, 1889.

London. Application of the National Telephone Company for permission to lay Cables beneath the pavements. HAYWOOD (W.), 1891, p. 35.

London and Paris, Telephone Communication between. PREECE, 1890.

London and Globe Telephone and Maintenance Company *v.* United Telephone Company, 1882. LONDON and Globe.

United States, Telephones in. Report on Statistics. SHUMAN (A. E.), 1883.

TELESCOPES.

Achromatic Telescope. RAMSDEN (J.), 1775. App. 572; SIMMS (W.), 1852.

Equatorial Instrument. RAMSDEN (J.), 1791. App. 572. SCHUCKBURGH (Sir G.), 1793, App. 576; SHORT (J.), 1749, App. 576.

—— Uniform movement of Equatorials, Regulator of the Clockwork. AIRY (Sir G. B.), 1840, p. 21.

Guinand's discovery in the Manufacture of Flint glass for large Telescopes. GUINAND, 1825.

Lick Telescope. BRASHEAR, 1886.

Machine for polishing, etc. with great exactness the glasses for large telescopes. STEWART (W.), 1855.

Melbourne Telescope Correspondence. ROYAL Society, 1871; ROBINSON (T. R.) and Grubb, 1869.

Mirrors, Telescope Objectives and. GRUBB (Sir H.), 1886.

Opera Glasses and Spectacles. Observations on. KITCHINER (W.), 1818, '24. App. 564.

Reflecting Telescopes. Use of silvered glass for Mirrors. AIRY (Sir G. B.), 1824, p. 22.

—— Directions for making the best composition for the metals. MUDGE (John), 1777. App. 569.

Refracting Telescopes, improvement by J. Dollond, F.R.S. DOLLOND, 1789.

Rosse's (Earl of) great Telescope. Account. ROBINSON (T. R.), 1845, '48.

Telescope (Encyclopædia Britannica). HERSCHEL (Sir J. F. W.), 1860, p. 51.

TELLURIUM. Presence of, in Copper, etc. EGLESTON, 1882.

TELPHERAGE. *See* ROPEWAYS.

TEMPER.

Capillary Affinities compared with Tempering. JULLIEN (C. E.), 1866.

Molecular Constitution of Tempered Bodies. LEGER, 1877.

TEMPERATURE.

Dynamical equivalent of, in liquid water. RANKINE (W. J. M.), 1850.
Earth, Temperature of the. QUETELET, 1841.
High Temperatures, measure of. LE CHATELIER (H.), 1892.
—— Optical measurement. LE CHATELIER (H.), 1892.
—— Thermo-Electric Measurement. BARNS (C.), 1889. Add. 483.
Isothermal, Monthly, Lines. DOVE, 1850.
Law of temperature in different latitudes. ATKINSON (H.), 1825.
Measure of temperatures raised by thermo-electric couples. LE CHATELIER (H.), 1887.
Radiation, Dependence of, on temperature. SIEMENS (Sir W.), 1883, p. 198.
Regulator (Temperature) improved form of. CAMBRIDGE Scientific Instrument Company, 1885.
Tables of Temperatures of Saturated Steam. PEACOCK (R. A.) 1874.
Temperatures developed in industrial furnaces. LE CHATELIER, 1892.
Underground Temperatures. PRESTWICH, 1886.

TERRA COTTA.

Chimney Shafts. BLASHFIELD, 1868.
Effects of temperature on terra cotta. READE, 1887–8.
Terra-cotta Lumber. ANONYMOUS, 1891, p. 57.

TESTS (TESTING APPARATUS).

Circular. Testing of Materials. CALIFORNIA University, 1887.
Employment of Autographic records in Testing Materials. UNWIN (W. C.), 1886.
Formula for testing pieces submitted to flexion and tension. REY (L.), 1890.
Frequent Repetitions of Load. KENNEDY (A. B. W.), 1885.
Machines, Testing. ABBOTT (A. V.), 1884.
Materials of Construction. Testing of. UNWIN (W. C.), 1888, p. 360.
Measuring Instruments used in Mechanical Testing. UNWIN (W. C.), 1887, p. 359.
Standard Tests. GRIFFITH (J. P.), 1890.
Testing of machine-parts. KELLER (K.), 1887.
Testing of Metal and Testing Machinery. HUNT (A. E.), 1889.
Test pieces: Bending of pressed pieces. Researches. JASINSKI (F.), 1894. Add. 512.
—— Measurement of elongation. WICKSTEED (J. H.), 1893.
Uniform Testing of Materials. BELELUBSKY, 1888.

TESTS (Testing Apparatus)—*continued.*

Building Materials. Munich, 1884.

Cement Testing Laboratory, Gothenburg. Wijkander and Wallin, 1894.

Iron. Tests and requirements of Structural Wrought Iron and Steel. Hunt (A. E.), 1891.

—— Machines for Testing Materials, especially Iron and Steel. Unwin (W. C.), 1887.

Iron and Steel and other Metals. Tetmajer, 1886.

Portland Cement testing. Unwin (W. C.), 1886, p. 360.

Steel. Specimens of Siemens and Bessemer Steel. Barnaby (J. F.), 1880.

Timber, strength and stress of. Barlow (P.), 1817, 1824.

Wire. Results of Tests for Tensile strength of Crucible Basic and Galvanised Basic Wire Ropes and Basic Steel Wire Rods. California Univ., 1893.

United States. Watertown Arsenal. Report of Tests on the strength of structural material. Parker (F. H.), 1884.

TEXTILES.

Esparto or Spanish grass. Mark, 1865.

Fabrics of Ancient Peru. Holmes (W. H.), 1889; Smithsonian Inst., 1889.

Machinery. Müller (Ernst), 1888, '89.

Printing of Textiles. Persoz, 1846.

THEATRE. Pierre, 1790.

Compendious description of a design for a theatre. Wyatt (G.), 1812.

Paris. Théatre Lyrique and Cirque Impérial. Report on heating and ventilation, 1861. Paris, p. 459.

Safety in Theatres. Büsing, 1894.

Stephenson's patent Theatre Machinery. Stephenson (Sir R. M.), 1840.

THERMO-CHEMISTRY. Berthelot, 1879, 1883; Naumann, 1882; Thomsen, 1882–86.

THERMO-DYNAMICS. Bertrand (J.), 1887; Hirn and Hallauer, 1883; Lippmann, 1889. Principles with special application to Hot Air, Gas, and Steam Engines. Röntgen (R.), 1880.

Elastic Fluids. Gill (J.), 1860–61.

Second law. Rankine (W. J. M.), 1865.

Sketch. Tait (P. G.), 1868, 1877.

See also Heat.

THERMOMETERS. HALLAUER, 1874.
Attempt to compare and connect the thermometer for strong fire and the common mercurial ones. WEDGWOOD (J.), 1784.
Atmospheric Thermometer. MÜLLER (F. C. G.), 1889.
Best method of adjusting Fixed Points of Thermometers. ROYAL SOCIETY, 1777. App. 575.
Construction and graduation. MARTINE, 1792; MARTINE, 1780. App. 567.
Electrical resistance thermometers. SIEMENS (Sir W.), 1875, p. 198.
Gas Thermometer. Absolute zero. RANKINE (W. J. M.), 1853.
History of the Thermometer, construction, etc. DELUC (J. A.), 1772. App. 553.
Mercurial. Variation of the mercurial from the air thermometer. ROWLAND (H. A.), 1880.
Self-recording Thermometer. RUSSELL (H. C.), 1888.
Thermometric Scales. PREECE, 1890; TWINING (T.), 1878.

THRESHING MACHINES. Ransome's portable Steam Threshing Engine and Hand Threshing Machines. PARKES (J.), 1841.

TIDES. ANONYMOUS, 1824; 1857, p. 57; ERSKINE, 1770; LENTZ, 1873, '79; LUBBOCK (Sir J. W.), 1839; PEARSON (J.), 1881.
Account of Daniel Bernouilli's Treatise. LUBBOCK (Sir J. W.), 1830.
Approaches, Tidal, and deep-water-entrances. REDMAN (J. B.), 1885.
Elementary theory. CORDEMOY, 1890.
Entrances to tidal rivers and Tides. SCOTT (A.), 1892.
Friction in the tides, supposed possible effect of, in influencing the apparent acceleration of the Moon's mean motion in longitude. AIRY (Sir G. B.), 1866, p. 22.
Gauge, Tide. REITZ, 1873, '84. Self-registering. Tide-gauge. MAXTON, 1843.
—— Self-acting. Sunderland Harbour. MEIK, 1850.
Geology. Tides and their action geologically and geographically considered. SOWERBY (W.), 1871.
Knowledge of the Tides. Report on recommendation of an Expedition. WHEWELL (W.) and Ross, 1848.
Manual of Tides and Tidal Currents. HAUGHTON (S.), 1870. Add. 506.
Motive force of the Tides, Utilisation of the. DIAMANT, 1890.
Navigations, Tidal, Improvement of, and Drainages. BROOKS (W. A.), 1854.
Observations, Tidal, Directions for reducing. BURDWOOD, 1858.
—— Diurnal Difference of the Tides. WHEWELL (W.), 1834.

TIDES—*continued.*

Observations. Manual for Tidal Observation.
BAIRD (A. W.), 1886.

Ocean, its tides and currents. JORDAN (W. L.), 1873, '85.

Phenomena, Tidal. MITCHELL (H.), 1868.

—— In connection with Atmospheric Pressure.
GREENWOOD (W. N.), 1894.

Power, Tidal Action a source of. McCALLUM, 1891.

Propagation and amplitude of tides on the North-east of Europe, from Brest to 63rd degree of North latitude.
VAUTHIER, 1886.

Report on the application of the sum assigned to Mr. Whewell for tide calculations. BUNT, 1840.

Researches. WHEWELL (W.), 1833–50.

Rivers, Tide of, and eddy tide (bar). COMOY, 1881.

Signals, Tide, as well as storm signals: a note on the recent high tide on the East Coast of Britain. ROBERTSON (G.), 1868, p. 121.

Survey, Exact, of the Tide. BARLOW (E.), 1717.

Theory. BENTLY, 1879; DEBENHAM, 1847.

Tidal Scour. BOULT (J.), 1881.

Waves, Tides and. AIRY (Sir G. B.), 1850, p. 23.

TIDES (BRITISH ISLANDS).

Blackwall and Teddington. Tidal Observations 1820, '22 and '23, made between. LEACH (S.).

British and Continental Ports. Height of Tide at.
GREENWOOD (W. N.), 1887, etc.

British and Irish Ports, 1877, etc. Tide tables for the.
HARRIS (H. R.), 1877. Add. 505.

Clyde. Tidal Velocities between Glasgow and Greenock.
DEAS, 1884.

England and Scotland. Tidal Observations at eighteen stations on the West Coast of England and Scotland.
GREENWOOD (W. N.), 1890.

English Channel. Report of the Committee appointed for the reduction and tabulation of Tidal Observations in, made with the Dover Tide Gauge.
BRITISH Association, 1886. Add. 488.

English Channel and North Sea. Report on the Phenomena of Stationary Tides in.
BRITISH Association, 1879, '80. Add. 487.

English and Irish Ports, 1857–58, Tide Tables for. BURDWOOD.

Ireland. Tides in the Irish Sea and British Channel.
SHOOLBRED (J. N.), 1877.

Lancashire Coast. Tide Tables. GREENWOOD (W. N.), 1887, etc.

Leith. Tidal Currents. MILNE (John), 1835.

TIDES (British Islands)—*continued.*

Mersey River Tides. Half tide Level at Liverpool.
Shoolbred (J. N.), 1875.

Plymouth Sound, tidal currents. Inglis (J. C.), 1877.

Severn, River. Beechey (F. W.), 1851.

Swansea. Tide table of the Solar times of high water; and the height of the tides at. Swansea, 1796, 1824.

Tees. Tide Tables and Mariner's Almanack.
Turnbull (G.) and Jordison, 1843–46.

Thames. Redman (J. B.), 1874–75.

—— Abnormal high tides. Redman (J. B.), 1882.

—— Laws of the rise and fall. Airy (Sir G. B.), 1842, p. 20.

—— Tidal observations on the River Thames at Sheerness, Blackwall, London Docks, Blackfriars, Westminster, Chelsea and Wandsworth. Burstal, 1856.

—— Register of Tides from 19 June to 19 July, 1849.
Thames, River, p. 297.

TIDES (Foreign).

Baltic. Hagen (G.), 1857.

Bombay and Kurrachee. Tide Tables. Parkes (W.), 1867.

Bombay Tides. Parkes (W.), 1866.

Brisbane. Tide Tables for the Port of. Cullen, 1892.

Canadian Waters. Survey of tides and currents in.
Canada, 1894. Add. 490.

Cutch, Gulf of. Baird (A. W.), 1880.

Indian Ports. Tide Tables. Baird (A. W.) and Roberts, 1880.

Kurrachee. Parkes (W.), 1866.

Malta. Airy (Sir G. B.), 1878.

Mediterranean. Pulligny, 1891.

New South Wales. Great Tidal Wave, May, 1877. Josephson.

North and Irish Seas. Greenwood (W. N.), 1892.

United States. Tide-Water Terminals of the Southern States.
Haupt (L. M.), 1889.

—— Lunar tidal wave in the North American lakes.
Graham (J. D.), 1861.

TILES.

Brick and Tile Manufactures in England. Cox (S. F.), 1881.

Bull's patent tubular tiles. Method of manufacture.
Bull (W.), 1887.

Inlaid Tiles, Specimens of, heraldic and geometrical, from Neath Abbey, Glamorganshire. Knight and Moxham.

Patent Roofing and Facing Tiles.
Architectural Tile Company, 1840.

TIMBER.

Building construction, employment of Timber in.
BURN (R. S.), 1874.

Cost of Conversions of the various descriptions of Timber in Dockyards, 1863. PARLIAMENTARY..Papers, p. 474.

Economical conversion of. BALE, 1883.

Formulas and tables for determining the scantlings of Beams and Joists of all timbers for engineering purposes.
ROBERTSON (W. W.), 1889.

Importer's (Timber) and Builder's standard guide. GRANDY, 1865.

Ironbark Timber, Strength and Elasticity of.
WARREN (W. H.), 1887.

Jarrah timber for shipbuilding, Qualifications of.
WESTERN Australia, 1871, p. 424.

Karri Timber. Correspondence. SOUTH Australia, 1882, p. 229.

Karri and Jarrah Timbers compared as to their relative value for construction of works, particularly for submarine operations.
WESTERN Australia, 1887, p. 424.

Lectures. LASLETT, 1867, '75.

Mahogany Tree. CHALONER and Fleming, 1850.

Measurements of Timber, Useful rules and tables relating to.
LALL (K.), 1869, '86.

Nature and constitution of Timber. LINGARD, 1819, '27;
TREDGOLD (T.), 1840, 1870, 1875.

Naval Timber. MELVILLE (Lord), 1810.

Pine and hemlock timber, compressive power of.
HEARDING, 1872.

Preparation of Wood. COIGNE, 1868.

Prepared wood exhibited at Paris, 1867. COIGNE, 1868.

Seasoning, due, for Ships of War. BENTHAM, 1814.

Solid measurement in cubic feet per log of round Logs. Table.
REUNERT (T.), 1873.

Strength of Timbers. Experiments. PERRAM (G. J.), 1884.
Tables. SEDDON (Col. H. C.), 1881.

Strength and stiffness of, practical treatise. TURNBULL (W.), 1833.

Torsion of Wood. BOUNICEAU, 1861.

Trees (Timber) and Timber. LASLETT, 1855, '67.

Use of Wood. EASSIE, 1874.

Andaman Forests, stiffness of various Woods from.
BENNETT (J.), 1872.

Australia. Applications of the results of testing Australian Timbers to the design and construction of timber structures.
WARREN (W. H.), 1890.

—— Experiments on the Hardwoods. CAMPBELL (F. A.), 1881.

Australian (West) Timber Company's Forest Resources, especially the Jarrah and Tuart. WEST Australian Timber Co., 1885.

TIMBER—*continued.*

British, Colonial and other Woods, Tables of the results of a series of experiments on. FOWKE, 1867.

Colonial Woods, experiments on the strength of. BALFOUR (J. M.), 1865.

—— Returns in reply to queries relating to Colonial Timber, 1878. PARLIAMENTARY..Papers, p. 518.

English Timber, conversion of. ANONYMOUS, 1886, p. 43.

Frazer's Island, Queensland. FRAZER'S ISLAND, 1879.

India. Gwalior territory Timber. THOMASON Civil Engineering Coll., 1853–4.

—— Felling Timber in the Himalayas. PAUL (G. P.), 1871.

—— Timber Trees. ROBERTSON (W. W.), 1889.

—— Indian and Burman Wood. Description and Strength. SKINNER (T. W.), 1862.

New South Wales. MOORE (C.), 1871.

—— Timbers of Commercial value, Strength and Elasticity of. WARREN (W. H.), 1887.

New Zealand. Durability of Timbers, 1874–75. NEW ZEALAND, p. 413.

Simla, Timber Operations in connection with the New Government Offices at. TUFNELL (C. F.), 1885.

Tenasserim Provinces, Teak Plantations in the, 1861. INDIA, p. 109.

United States, Woods of the. SARGENT (C. S.), 1885.

—— Woods of the States of Virginia, Carolina, and Georgia. RICHMOND and Danville, 1889.

TIMBER (DECAY).

Decay and preservation. CRAM, 1871.

Dry Rot. BIDLAKE, 1889.

Enemies to Timber in Marine Work. COLE (T.), 1880.

Limnoria Terebrans, ravages of. COLDSTREAM, 1834;

—— Creosoted timber. STEVENSON (D.), 1862, p. 250. Greenheart Timber. STEVENSON (D.), 1873, p. 251.

TIMBER (PRESERVATION). FRÉVET, 1877; PAULET, 1874; WOOD (De V.), 1883.

Absorption of Liquid Solutions by growing timber. HYETT, 1842.

Boucherie's (Dr.) process. BOUCHERIE, 1841; LEROUX, Sochet and Dupony, 1856; MILLS (W. H.), 1856; PERMANENT WAY Co., 1850. '57.

—— Report of the Paris Exhibition of 1855. PERMANENT WAY Co., 1855.

Burnett process. BURNETT (Sir W.), 1843. Extension of patent. BURNETT (Sir W.), 1852.

—— Prospectus and testimonials. BURNETT (Sir W.), 1851.

—— Testimonials in favour of Sir W. Burnett's patents. BURNETT (Sir W.), 1858.

TIMBER (Preservation)—*continued.*

Creosote oil. Carolina Oil and Creosote Co.

—— Description of Creosote best suited for creosoting timber. Tidy (C. M.), 1883; Tidy (C. M.), 1883. Add. 536.

—— Evaporation of Phenols from Creosoted Timber. Prindle, 1890.

—— Improvement in the process for Creosoting. Boulton (G. B.), 1882, 1885; Boulton (S. W.), 1882. Add. 486.

—— Note on the application of Creosoted Oils for the preparation of woods. Coisne (C.), 1864, 1866. Add. 492. Stevenson (D.), 1862.

Decay, Nature and properties, and methods for its preservation from. Burt (H. P.), 1854.

—— Prevention of decay in Timber for shipbuilding and other purposes. Lapparent, 1862.

Dry Rot in Timber. Origin, progress, prevention, and cure of. Britton (T. A.), 1875; Bowden, 1815; Faraday (M.), 1838.

Durable. Patent for rendering Wood more durable. Bethell, 1860.

Gardner process of seasoning and preserving Timber. Deas, 1877.

Hydro-carbon Oils, Facts and Scientific Opinions about Wood, preserved by. Anonymous, 1869, p. 45.

Impregnation of Timber. Warth (Dr.), 1875.

Kyan's patent for preventing dry rot. Birkbeck, 1834.

Payne Patents for the Preservation and Improvement of Wood. Payne (C.), 1849.

—— Payne *v.* Banner. Correspondence and depositions. Payne (C.), 1843.

Production of Timber for the building of Ships. Yarranton, 1677.

Report of Committee on Timber Preservation. American Society of Civil Engineers, 1885.

Strength of Round Timber. Preece, 1885.

Teredo navalis, and the means of preserving Wood from its ravages. Baumhauer, 1878; Forestier, 1866, '78; Sellius, 1733.

Termites. Berg, 1880. Ravages of the White Ant. Saint Helena, 1864.

Thilmany Patent for preserving Timber. Manhattan Wood Preserving Co., 1881.

TIME.

Adoption of the Twenty-four o'Clock Notation on the Railways of America. American Soc. of Civil Engineers, 1892.

Ancient Methods of dividing and recording Time in Japan. Egleston, 1892.

Greenwich Time the Standard throughout Great Britain. Frodsham (C.), 1848, p. 558.

TIME—*continued.*

Horological disquisitions on the nature of Time, and the reason why all days are not alike. SMITH (John), 1694 ; SMITH (John), 1694. App. 577.

Kosmic Time and Prime Meridian Memorandum. SMYTH (C. P.), 1883.

New method of measuring the minutest fraction of time. NEGRO, 1816. App. 570.

Reckoning (Time), and selection of a Prime Meridian to be common to all Nations. FLEMING (S.), 1880.

Standard of Time, Canadian Documents relating to the fixing of a standard. CANADA, p. 218.

Table for determining the Apparent, from observed Altitudes of the sun or a star. ANONYMOUS, 1818, p. 56.

Terrestrial Time. FLEMING (S.), 1878.

Time Reckoning for the Twentieth Century. FLEMING (S.), 1889.

Uniformity of Time considered in reference to Railway transit, and the operation of the Electric Telegraph. BOOTH (H.), 1847. App. 549.

Universal reading of time (or 0 sec. midnight to 24 hours midnight). PARKER-RHODES, 1885.

Universal Time. CHRISTIE (W. H M.), 1886.

TIN. BEVAN (G. P.), Industries, vol. 1.

Alluvial Tin Prospecting, 1893. WRAY (L.). Add. 539.

Antiquity and the Middle Ages. BAPST, 1884.

Chief methods of mining, dressing, and smelting it abroad. CHARLETON, 1884.

Stannaries Act, 1869. BALTEN, 1893.

Tinners' Ready Reckoner ; or, Sure guide at the Smelting House. THOMPSON (James), 1827.

Ben Lomond and St. Paul's River Tin Deposits, Tasmania. Report. BEN LOMOND, 1881.

Cornwall. Tin Trade of the Ancients in Cornwall. HAWKINS (Sir C.),1811.

—— to India, Persia, and China. Trade in Tin. UNWIN (J.), 1790.

Cornwall, Tasmania, Great Republic Tin Mine. Report on the recently discovered Tin Ore Lode. GREAT REPUBLIC Tin Mine, 1890. Add. 504.

Larut. Tin mining in. DOYLE (P.), 1879.

New England. Tin-bearing Country. Report, 1873. NEW SOUTH WALES, p. 402.

TIN—*continued.*

Ringarooma (River). Stanniferous Deposits in the vicinity of. RINGAROOMA River, 1884.

Tasmania Tin Ore load. Report. TASMANIA, 1890.

TIRES for Wheels. BODMER (J. G.), 1842.

TITHES.

Exaction of Tithes. Petition of the inhabitants of Elm cum Emneth parish, Counties Norfolk and Cambridge. WELLS (S.), 1827.

Proposed Survey of Lands under the Tithes Act, 1837. PARLIAMENTARY Papers, p. 518.

TOBACCO. BEVAN (G. P.), Industries, vol. 9.

Culture and Curing of Tobacco in the United States. KILLEBREW, 1883.

Statistics of Manufacture, commercial distribution, exportation, and prices. DODGE, 1883.

TOLLS.

Belgium, Tolls. BELGIUM, 1838. Add. 484. Toll Concessions. BELGIUM. Add. 484.

TOMBS AND CENOTAPHS.

Ancient Tombs of Nicaragua. BOYLE (F.).

Cemetery Designs. GEARY, 1840.

TOOLS.

Catalogue of Collection at the Royal Polytechnic School, Hanover. KARMARSCH, 1870.

Construction and Manipulation. KNIGHT, 1881.

Cutting Tools worked by Hand and Machine. SMITH (Robert H.), 1882.

Electro-magnetic machine tools. ROWAN (F. J.) 1887, p. 134.

Hand-cutting tools. SHELLEY (C. P. B.), 1873, '83.

Improved Machine Tool for turning Crank-pins of Locomotives. LAKE (W. R.), 1888.

Machine Tools. BAKER (T.), 1867 ; DIXON, 1888 ; HUTTON (F. R.), 1885.

Manufacture of Hardware, Cutlery, and Edge Tools, Saws, and Files. FITCH, 1883.

Mechanic's Tool Book. HARRISON (W. W.), 1868.

Mining Tools. MORGANS, 1871.

TOPOGRAPHY.

Course at the École des Mines, Paris. ANONYMOUS, 1880, p. 41.

Elementary treatise. BONOLIS, 1876.

Axholme, Isle of. READ, 1858.

TOPOGRAPHY—*continued.*

Barrow-in-Furness. Rise and progress. LEACH (F.), 1872.
Beachy Head. BOURDILLON (F. W.), 1885. Add. 486.
Brighton and environs. MARTIN (H.), 1871.
Bristol, Clifton, and the Hotwells. CHILCOTT, 1826.
British Channel, Views in the. STANFIELD (C.), 1836.
British Empire, Descriptive Account of the. MCCULLOCH, 1854.
Burton-on-Trent: its history, waters, and breweries.
MOLYNEUX (W.), 1869. Add. 521.
Cambridge. Memorials, Views of Colleges, etc. LEKEUX, 1847.
Casa Caradoc. Visit to the Chateau. CASA Caradoc, 1875.
Cheshire. BAINES (T.) and Fairbairn, 1868–69.
Chester. Iron and Steel Institute. CHESTER, 1884; IRON and Steel Inst.
Chester to London, Journey from. PENNANT (T.), 1811.
Cirencester, the site of Corinium. Roman Remains.
BUCKMAN and Newmarch, 1850.
Clapham. Plan of the Parish. BLAND (A. and R.), 1849.
Conway, and five days in Wales. CONWAY, 1837.
Cork City. How it may be improved. WALKER (Robert), 1883.
Crewe. History of the borough. CREWE, 1887.
Crosby Place, London, Architectural Antiquities.
HAMMON (H. J.), 1844.
Dartmoor. The Moorland Plym. WORTH (R. H.), 1889.
Derby. ADAM (W.), 1843.
East Anglia. Holiday Notes. EAST ANGLIA, 1886.
Edinburgh Cross. STEVENSON (R.), 1824.
Edinburgh and its neighbourhood. MILLER (Hugh), 1869.
England, Rambles in Eastern. BERLYN (A.), 1894, p. 485.
—— Kalm's visit to England on his way to America in 1748.
KALM, 1892.
—— Tour through England, Wales, Scotland.
BURLINGTON, Rees, and Murray, 1779.
—— Parliamentary Gazetteer of England and Wales.
GAZETTEER, 1840–43.
England and Wales, 1850. LONG and Porter.
Enstone, Oxfordshire. Parochial history.
JORDAN (Rev. J.), 1857.
Essex, New Holidays in. LINDLEY (W.), 1891.
Fenland. Reminiscences of Fen and Mere. HEATHCOTE, 1876.
Fenland past and present. MILLER (S. H.) and Skertchley.
Godmanchester. History. FOX (R.), 1831.
Gravesend. History. CRUDEN, 1843.
Great Britain and Ireland. Rise and progress of geography.
INNYS, 1780.

TOPOGRAPHY—*continued.*

Hartwell Manor and Mansion. SMYTH (Admiral W. H.), 1851.
Harwich and Dovercourt. DALE (S.), 1730.
Hebrides. Cruise of the Betsey. MILLER (Hugh), 1869.
Holyhead and Roads to it from Shrewsbury and Chester. DAWSON, 1811.
Hythe. BUSK, 1860.
Kent. Topographical and statistical description. COOKE (G. A.), 1820.
—— Weald of Kent. DEARN, 1814.
Lancashire. BAINES (E.), 1870; BAINES (T.) and Fairbairn, 1868–69.
—— Character and Places. NEWBIGGING, 1891.
—— County Palatine and Duchy of Lancaster. BAINES (E.), 1870.
Landguard Common. Report to the Board of Trade, 1874. COODE (Sir J.). Add. 493.
Liverpool, Across to. BAGGALLAY, 1884.
—— Ancient and present state. LIVERPOOL, 1795.
—— Speculations. BOULT (J.), 1866–73.
London, Account of. PENNANT (T.), 1791.
—— As it should be. STONESTREET (G. G.), 1800.
—— Curiosities of London. TIMBS (J.), 1855.
—— London and its environs. Topographical Dictionary. ELMES (J.), 1831.
—— Guildhall of the City of London. PRICE (J. E.), 1886.
—— Handbooks. BAEDEKER; MURRAY (John), 1876.
—— London in the reign of Henry VIII. NEWTON (W.), 1855.
—— History and Survey, 1753. LONDON, p. 253.
—— Metropolitan Improvements. BENNOCH, 1857.
—— Modern London, 1888. LONDON, p. 254.
—— London Past and Present. WHEATLEY (H. B.), 1891.
—— London and Westminster, and Southwark. History and survey. CHAMBERLAIN (Henry), 1770.
—— Survey of London and Westminster. STOW (J.), 1720.
Man, Isle of. History. CUMMING, 1848.
—— Scenes in. CAINE (T. Hall), 1894. Add. 490.
Matlock Bath and its vicinity. ADAM (W.), 1843.
Middlesbro'-on-Tees. Description of the Town. TURNBULL (G.), 1846.
Middlesex, County of. Domesday Book. Translation. MIDDLESEX, County of, 1862. Add. 520.
Morecambe Bay, Barrow-in-Furness, North Lancashire, West Cumberland, &c. CLARKE (H.), 1884.
Newport Mon. Handbook. KIRBY (C.), 1891.

TOPOGRAPHY—*continued.*

Norfolk Broads. SUFFLING (E. R.), 1887. Log of the "Lalage." GARDYNE, 1891.

—— Poppy land, scenery on the East Coast. SCOTT (C.), 1886.

—— Three weeks in Norfolk. CLARKE (J. F. M.), 1887.

Northumberland, Durham, Newcastle and Berwick. Local Records or historical register of remarkable events. SYKES (J.), 1832.

Northwoods, Gloucestershire, visit to. CHRISTOPHER, 1848.

Oxford, Memorials. RIGAUD (S. P.), 1834.

Porthcawl as a health resort. HUNTER (R. C.), 1891.

Reculver. Antiquities. BATTELY, 1774.

Regent's Park. Proposed improvement of the Western part of London by the formation of. WHITE (John), 1815.

Richborough. Antiquities. BATTELY, 1774.

St. Andrew's. History. LYON, 1838.

St. Ives Bay, Cornwall. Report. VETCH (J.), 1847.

St. Pancras. BRITTON and Brayley.

Scotland. Topography of Scott's Lady of the Lake. AIRY (Sir G. B.), 1873, p. 22.

—— Tour through the Highlands. BOTFIELD, 1830.

—— Tour in. SOUTHEY (R.), 1819.

Severn Valley. RANDALL, 1862.

Sheffield and district. Illustrated guide to. TAYLOR (John), 1879.

Shropshire. Valleys and Watercourses of. AIKIN, 1818.

Smithfield. Improvements in the neighbourhood proposed by the Corporation of London, 1851. BUNNING, 1851.

Southampton. DAVIES (Rev. J. S.), 1883.

Thanet, Isle of. HUNTER (R. C.), 1779.

Torbay, Note on. HUNT (A. R.), 1878.

Torquay: its climate, drainage, water supply, and health Statistics. TORQUAY, 1884.

Tower Hamlets. Plan. BEEK, 1850.

Tyne, Wear, and Tees. Industrial resources of the district of the three northern rivers. ARMSTRONG (Lord), etc., 1864.

Wales, North. Tour. AIKIN, 1797.

Wales, South. Run through, viâ the London and North Western Railway. DOUGLAS (J. P.), 1868.

Whitkirk. Records of the Parish. PLATT and Morfitt, 1892.

Wight, Isle of. Picturesque Illustrations. BARBER, 1850.

Wisbech and the Fens. WALKER (N.) and Craddock, 1849; WATSON (William), 1827; WISBECH, 1834.

Yorkshire. History. BAINES (T.), 1871–77.

—— Adjacent to the level of Hatfield Chase truly represented. YORKSHIRE, 1701.

See also GEOGRAPHY.

TOPS, Spinning, PERRY (Prof. J.), 1890.

TORPEDOES. ANONYMOUS, 1868, 1878, p. 57; RAINS, 1877; SARREPONT (H. de), 1880; WANDERVELDE, 1869.
Drifting and automatic movable Torpedoes. BARBER (F. M.), 1874.
Fish Torpedoes. EHRENKROOK, 1878.
Harvey's Sea Torpedoes. Instructions for the management. HARVEY (F.), 1871.
History. ANONYMOUS, 1877, p. 46.
Horizontal-acting and disconnecting Spur-Torpedo-Ram. PALMER, 1873.
Manufacture of torpedoes at the arsenal of Amsterdam. GARNAULT.
Movable Torpedoes. ERICSSON, 1873.
National defence. JAQUES, 1886.
New machines for torpedo makers. DEMOULIN, 1888.
Notes. STEWARD (H.), Capt., 1866.
Offensive and defensive. STOTHERD (R. H.), 1872.
Offensive Torpedo Warfare. DAWSON (W.), 1871.
Physical, chemical and physiological researches. MATTEUCCI, 1837–
Question, Torpedo. ERICSSON, 1873.
Sea-mining and torpedoes. EHRENKROOK, 1878.
Submarine Warfare, Defensive. BARNES (J. S.), 1869; STOTHERD (R. H.), 1871.
Use of the "Torpedo" and the "Ram" in resisting invasion. GRANT (C. W.), 1877.
Use for the defence of ports. ANONYMOUS, 1868, p. 43.
Torpedo Warfare. JAQUES, 1888; SLEEMAN (C. W.), 1880, 1889.
—— Index of Publications. FISCHER-TRUENFELD, 1889.
Whitehead Torpedo. BARBER (F. M.), 1874.

TORPEDO BOATS.
Guide for the Stoker and Engineman. CLERGEAU, 1888.
Torpedo boats. DONALDSON (J.), 1882.
Thornycroft Torpedo-boats, construction, armament, etc. DONALDSON (J.), 1877. Improvements. DONALDSON, 1889.
U.S. Torpedo-boat "Cushing," experiments. ISHERWOOD, 1892.

TOWAGE (CHAIN), with Magnetic Adhesion. MOLINOS (L.) and Bovet, 1893. Add. 521.
Metallic Cable Towing. Mesnil System. BUQUET, 1869.
Tug-boat traction. TEICHMANN, 1880.

TOWAGE (Electric) of boats. GALLIOT, 1892.

TOWAGE (Steam). Drawing vessels by locomotive engine boat in Canals and Navigable Rivers. GRAHAME, 1825.

TOWERS.

Catalogue of sixty-eight competitive designs for the great Tower for London. LYNDE, 1890.

Tower of 984 feet, Paris. EIFFEL, 1889.

TOWNS. Well-being of the inhabitants of great towns. AVIGDOR, 1874.

TOYS. BEVAN (G. P.). Industries, vol. 8.

TRACTION (ELECTRIC). *See* ELECTRICITY (Motors); RAILWAYS (Electric).

TRACTION ENGINES. *See* STEAM TRACTION ON ROADS.

TRADE.

Depression, its cause and remedy. ROSS (O. C. D.), 1885.

Destruction of the American Carrying Trade. EDGE, 1868.

Health of Trades. ROTH, 1894. Add. 531.

Belgium. Commerce with Foreign Countries, 1874–79. BELGIUM, p. 118.

Burmah, the Shan country, and S.W. China, Trade Extension between. COLQUHOUN, 1882.

Chile and Great Britain, Trade between. Report. ROSS (A.), 1892.

India. Trade and Navigation of British India with Foreign Countries, 1878, etc. INDIA, p. 108.

—— Review of the Trade, 1887, etc. INDIA, p. 108.

—— Reports on the State of Trade, etc., 1772–73. INDIA, p. 109.

Lancashire, Eastern Markets for. HALLETT (H. S.), 1889.

Newfoundland. Reports, 1793. NEWFOUNDLAND.

Plymouth. COLLIER (W. F.), 1878.

United Kingdom. ODDY, 1805; REDMAN (J. B.), 1872.

—— Trade and Navigation, 1878–82. PARLIAMENTARY..Papers, p. 518.

—— Annual Statement of the Trade of the United Kingdom with Foreign Countries and British Possessions, 1878, etc. PARLIAMENTARY..Papers, p. 518.

—— Statistical Tables showing the progress of British Trade and Production, 1854–90. PARLIAMENTARY..Papers, p. 518.

—— Reports of Royal Commission on the depression of Trade and Industry, 1886. PARLIAMENTARY..Papers, p. 518.

See also ARTS AND MANUFACTURES, COMMERCE, INDUSTRY.

TRADE MARKS.

British, foreign, and colonial laws. HARDINGHAM, 1881.

Designs and Industrial Property. Treaties and Declarations between Great Britain and Foreign Powers, 1888. PARLIAMENTARY..Papers, p. 518.

TRADES UNIONS.

Abroad, and hints for home legislation. HOVELL-THURLOW, 1871.

Economic unsoundness of some Trades Union Doctrines. HEAD (J.), 1872.

London. Statement of Master Builders, 1834. LONDON, p. 270.

TRAFFIC.

London Street Traffic, Relief of. BARLOW (P. W.), 1867.

Sydney Vehicular Traffic, Report on means of regulating. SYDNEY, 1891, p. 273.

Tower Bridge Traffic, July 9th to Sept. 8th, 1894. TOWER BRIDGE.

TRAMWAYS (GENERAL REFERENCES). BARABANT, 1884; CUMMING (T. G.), 1834; GALIMBERTI, 1887. Add. 501; PAIN (A. C.), 1873; PAIN (C. S.), 1882; SERAPON (F.), 1882.

Act to facilitate the construction and working, 1870; Report on Tramways Bill, 1870; Bill for confirming Provisional Orders under Tramways Act, 1870. PARLIAMENTARY..Papers, p. 518.

Board of Trade Report on Tramways and Gas and Water Orders Acts of 1870. PARLIAMENTARY..Papers, p. 519.

Construction. ADHÉMAR, 1860; ANONYMOUS, 1888, p. 43.

—— Construction and Working. CLARK (D. K.), 1878–82; DOWSON (J. E. and A.), 1875; FADDA, 1887, '91, '92. Add. 499–500; SCHOELLER (A.), 1892; VIAPPIANI, 1893.

—— Improved system. GUNSON, 1879.

—— Memoranda on proposals contained in the Tramways Provisional Orders Confirmation Bills (Nos. 1, 2, 3) 1888. PARLIAMENTARY..Papers, p. 519.

—— Modern Tramway Construction. JONES (A. W.), 1879.

—— Street Railways, their construction, operation, and maintenance. FAIRCHILD, 1892.

Construction. Regulations which it may be desirable to impose in relation to the construction and use of Tramways, 1879. PARLIAMENTARY..Papers, p. 519.

Development of Tramways. VINCENT (C.), 1882.

Flange and Groove versus Flat-tire wheels. PIMM, 1886.

Foreign Countries. Reports respecting Tramways in 1872. PARLIAMENTARY..Papers, p. 518.

—— Tramways and light railways on historic routes. CHALLOT, 1877.

TRAMWAYS (General References)—*continued.*

Law. Ferraris, 1881 ; Vigoureux (E.), 1886.

Location. Baudson, 1884.

Parkhouse Tramway. Report of the Sub-committee of Royal Engineers on its working. Royal Engineers, 1870.

Permanent way for Tramways. Vignoles (H.), 1879.

Rails. Tables and diagrams for curving Tramway Rails. Olive, 1885.

Report on Tramways (use of Mechanical Power) Bills, 1878. Parliamentary..Papers, p. 518.

Sleepers and permanent ways for Tramways, International Exhibition. Société Belge des Ingénieurs, etc., 1886.

—— Patent bedplate, iron girder, solid sleepers, and rails for street tramways, high roads. Wright (Thomas) (C. E.), 1860.

Street Railways. Lynde, 1874 ; Rammell, 1857 Train (G. F.), 1860

Street and Road Tramways. Return, 1877, etc. Parliamentary..Papers, p. 518.

Town and Country. Matheson, 1878.

Train Tramways, their organization and advantages. Vian (G.), 1887.

Australia (South). Tramways, Estimate of Cost. South Australia, 1873, p. 230.

—— Reports on Iron ways for Roads. South Australia, 1871, p. 230.

—— Metalled roads. South Australia, 1871, p. 230.

Barsee with the Barsee Railway-Station, project of connecting by Tramways, 1863. India, p. 110.

Belgium. Raillard, 1874.

Birkenhead Street Railway, the first in Europe. Report of the Banquet given to inaugurate the opening of. Train (G. F.), 1860.

Bradford. Queries and Replies. Cox (J. H.), 1882.

Brentford and District Tramways Act, 1885. Abandonment Act, 1890. Brentford.

British and Foreign Tramway Companies. Duncan (W. W.), 1883, etc.

Cavan, Leitrim, and Roscommon Light Railway and Tramway. Cavan, 1891.

Croydon and Norwood Tramways Company. Act of Amalgamation. Croydon, 1883.

Decauville Tramway. Illustrated Guide. Caen to Dives Magron (H.), 1892. Add. 517.

Ireland. Map. 1884. Ireland, p. 143.

—— Tramways applicable to Ireland. Sloane (J. S.), 1883.

TRAMWAYS (General References)—*continued.*

Landsborough to the Blackall Range, Queensland.
Phillips (G.), 1890.

Lille to Roubaix and Lille to Tourcoing. Compagnie des tramways du département du Nord, 1889. Lille.

Liverpool. Reports, 1874, '76. Liverpool, p. 246.

London. Bill to facilitate the construction and regulate the working of Tramways, 1870. London, p. 270.

—— Commercial Road and East London Tramway Bill.
Redman (J. B.), 1869.

—— London Omnibus Tramway Company.
Haywood (W.), 1858, p. 32.

—— Metropolitan Tramway Act, 1870. Proceedings of the Board of Trade. London, p. 270.

—— Metropolitan Tramways. Map. Stanford (E.), 1878.

—— North London Tramways. Isaacs, 1870.

—— North London Tramways Act, 1886. London, p. 270.

—— North Metropolitan Tramway Company.
Haywood (W.), 1873, p. 32.

—— Report on Metropolitan Tramways.
Bazalgette (Sir J. W.), 1870, p. 108.

—— Report, etc., from Joint Select Committee on the Tramways of the Metropolis. London, p. 270.

—— Reports on Street Tramways, 1870–71.
Haywood (W.), p. 32.

—— Report of Parliamentary Committee on the Tramway Schemes for 1871. London, p. 270.

—— Reports on Projects. Haywood (W.), 1874–77.

—— South London Tramways Act, 1883. London, p. 270; South London Tramway Co.

—— Street Tramways. Mackay, 1868.

London and Suburbs. Bright (H.), 1868.

—— Projected Tramways affecting Westminster Bridge, Thames Embankment, and neighbourhood of the Houses of Parliament, 1871. London, p. 270.

Manchester. Barker.

Mansourah to Menzaleh and Matarieh, Contract charges for the establishment of a Tramway from, with branches.
Egypt, 1893. Add. 498.

Milan. Bianchi, 1883; Tommasso (L.), 1882.

—— Milan, Gorgonzola, and Vaprio Tramway Company, 1879.
Milan.

Nagpore and the Eastern districts of the Central Provinces, projected Tramways for. 1864. India, p. 126.

New Zealand. Reports, 1872. Construction, 1871.
New Zealand, p. 413.

TRAMWAYS (General References)—*continued.*

New Zealand. Tramway System at the Thames and Coromandel, 1872. New Zealand, p. 413.

Oldham, 1878. Plans and Sections. Oldham.

Paisley and District Tramways Bill. Select Committee of the House of Commons, 1884. Paisley.

Paris. Means of transport common to London and Paris. Serafon (F.), 1872, p. 184.

Queensland. Report. Queensland, 1874, p. 73.

Rusholme. Gunson, 1880.

Salford. Report. Salford, 1873.

Southwark, Deptford and other places in Surrey and Kent. Act, 1879. Southwark.

Swansea. Proceedings to promote their introduction. Swanska, 1874.

United Kingdom. Tramways Act, 1874. Sutton (H.).

—— Tramway Companies. Duncan (W. W.), 1877.

—— Construction and working. Clark (D. K.), 1894. Add. 492.

Wellington, N.Z. City Tramways Company. Promoters' details of construction. Wellington, N.Z., 1876.

TRAMWAYS (Mechanical Power).

Employment of mechanical motors for them. Rowan (W. R.), 1877.

Mechanical Power on tramways. Webb (W.), 1878.

Street Railway Motors, cost of plants. Haupt (H.), 1893.

TRAMWAYS (Cable or Rope).

Cable Tramways, without locomotives or horses. Devooght, 1882.

Wire Cable system. Robinson (James Clifton), 1883.

Wire Ropeways. Carrington (T. H.), 1878.

Birmingham. Central Tramways Company Cable system. Birmingham C. T. C., 1886, 1887.

Chicago Cable Roads. Miller (D. J.), 1882.

Melbourne. Cable Tramway System. Report of the City Surveyor. Richards (R. W.), 1889.

TRAMWAYS (Motive Power).

Compressed Air. Scott-Moncrieff Tramway System. Scott-Moncrieff (W. D.), 1876.

Electric. Dickinson (A.), 1893; Raffard, 1883–87; Reckenzaun, 1885, 1892.

—— South Staffordshire Tramways Company. Dickinson, 1893.

TRAMWAYS (Motive Power)—*continued.*

Electric. Hamburg. System Julien. Huber, 1888.

Horse. Galimberti, 1888. Add. 502. Animal and mechanical traction. Anonymous (1876), p. 57.

—— Street or Horse power railways. Easton (A.), 1859.

—— Observations. Train (G. F.), 1860.

Steam. Cole (T.), 1884; Grantham (J.), 1874; Stern, 1882.

—— Remarks on working them by Steam Power. Todd (L. J.), 1874.

—— Report on employment of Steam and other Mechanical Powers on Tramways and Public Roads, 1877. Parliamentary..Papers, p. 518.

—— India, Steam Tramways in. Vincent (C.), 1881.

TRANSFERS.

Act to remove doubts as to the meaning of the Forged Transfers Act, 1891. Parliamentary..Papers, p. 519.

TRANSPORT.

Carriage of Goods. Navier, 1835.

Comparative cost by railway and canal. Conder, 1882.

New system. Baldwin (J. S.), 1884.

Problems. The Commercial Paradox. Haupt (L. M.), 1888.

Sea Transport, Notice on different modes of. Trogneux, 1889.

Transformation of means of Transport and economic and social consequences. Foville, 1880.

Waterways and Railways. Pescheck, 1892.

Africa. Steamboat transported on wheels 1,600 miles. Thorburn (J.), 1889.

France. Routes of transport in France. Brunfant, 1876.

India. Military transport by Indian Railways. Ross (D.), 1879, 1883.

—— Land and Water Carriage in India. Chesney (G.), and Cotton, 1871.

Manchester and Liverpool, cost of conveyance between. Conder, 1882.

Maritime. Compagnie Maritime et Fluviale de Transports. Société d'Études pour la Compagnie, etc., 1892.

Spanish Pack Saddle. Report. Somerset (Capt. F.), 1863.

United States, Development of Transportation Systems in the. Ringwalt (J. L.), 1888.

—— Great Transportation Areas. Haupt (L. M.), 1888.

—— Report of the Select Committee on Transportation Routes to the Seaboard. United States, p. 357.

TRANSPORT—*continued.*

United States. Routes from the West to the Seaboard. Oswego Board of Trade. McAlpine, 1873.

—— Transportation and Engineering and Steam Transportation. Report of the sections of, in the U.S. National Museum. Watkins (J. E.), 1889, '90.

TRAVELLERS, International securities for the lives and health of. Chadwick (Sir E.), 1887, p. 235.

Data for travellers, railway men and mechanics. Nicholl (T. J.), 1892.

TREADMILL. Invented by Sir W. Cubitt for the employment of prisoners, and its application to a corn and flour mill. Cubitt (Sir W.), 1822.

TREATIES.

Spain and England, Treaty Negotiations. Jamar, 1882.

Utrecht, Treaty of. Utrecht, 1803.

TREES. *See* Forestry.

TRIALS. *See* Law Cases.

TRIGONOMETRY. *See* Mathematics.

TRUSSING.

Fink, Bollman and Warren. Systems of Trussing. Alexander (T.), 1880.

Roof Trusses. Charnock (G. F.), 1888.

Trusses of Wood and Iron, stresses, breaking weights, &c. Griffiths (W.), 1886.

TUNNELS. Anonymous, p. 42.

Bridge and Tunnel Centres. McMaster, 1875.

Construction of great tunnels. Fontenay, 1863.

Explosive Compounds and Rock drills. Drinker, 1878; Drinker, 1893. Add. 497.

Machine for drilling tunnels, etc. Penrice (H. N.) [1881 ?].

New plan of. Brunel (Sir M. I.), 1823.

Railway Tunnels. Solerti, 1889–92. Add. 534.

Railway Tunnelling in heavy ground. Gripper (C. F.), 1879.

Rapid construction of great tunnels. Bridel, 1883.

Shafts, Construction of large. Buck (J. H. W.), 1880.

Statics of Arched. Ritter (W.), 1879.

Sub-aqueous and other tunnels. Beach, 1868.

Submarine Tunnels. Brick arch within an iron skin, laid in a trench dredged for that purpose. Foster (J. G.), 1872.

TUNNELS—*continued.*

Tunnel building. Dolezalek, 1889; Heusinger von Waldegg, 1877, '83. Add. 507; Lorenz, 1860; Rziha, 1867–72; Schoen (J. G.), 1874; Simms, F. W., 1844, '59, '77.

Tunnelling through various strata. Lean (J.), 1888. Add. 514.

Tunnels and Inclined Planes as forming parts of railways. Anonymous, 1830, p. 51.

—— Advantages of constructing, ventilating and working Railway Tunnels, with three separate openings. Crampton (T. R.), 1884. Add. 494.

Use of compressed air in. Colladon, 1887.

Working of railways through long tunnels. Weber (Max Marin von), 1877.

Alpine. Tunnelling through the Alps. Devillez, 1863.

—— Between Bardonnêche and Modane. Gernaert and Witmeur, 1869; Sommeiler, 1863.

—— Mont Blanc. Sacheri, 1880.

—— Underground heat. Stockalper (E.), 1883.

—— Photography of the tunnelling. Vialardi (A. L.), 1868.

Argentera Tunnel and construction of tunnels. Maristany y Gibert (E.), 1891–2. Add. 518.

Arlberg. Locomotives. Rziha, 1885.

Channel Tunnel. Brabourne (Lord), 1882. Add. 486; Bramwell (Sir F. J.), 1883. Add. 487; Brockmann, 1871. Add. 488; Dawkins, 1883; Hawkshaw (J. C.), 1882; Tylden-Wright (C.), 1882.

—— Proposed Anglo-French submarine Tunnel. Study. Thomé de Gamond (A.), 1857, '70.

—— Bill to empower the Company to make railways in Kent in connection with their Channel Tunnel. Channel Tunnel, 1883.

—— Bill to provide communication between England and Europe by means of a Railway and a tunnel under the Straits of Dover. South Eastern Railway, 1883.

—— Correspondence. Channel Tunnel, 1873–82, 1875; Channel Tunnel, 1882–3. Add. 491.

—— Currents, &c., in the Straits of Dover, &c. Channel Tunnel, 1860–62.

—— Across the Straits of Dover. Colladon, 1883.

—— English Agitation against. Valbert (G.), 1882. Add. 537.

—— France and England. Tunnel under the sea between. Austin (W.), 1872. Add. 482.

—— From the point of view of International Law. Coulson (H. J. W.), 1882. Add. 494.

—— Public opinion. Knowles (J.), 1883. Add. 514.

TUNNELS—*continued.*

Channel Tunnel. Channel Railway Tube or Tunnel. Bishop (P. J.), 1876.

—— Railway between France and England. Larousse, 1875–76.

—— Through trains. Macassey, 1890.

—— Constructing of a Railway beneath the sea. Walker (William T.), 1870.

—— Report of Commissioners. Channel Tunnel, 1876.

—— Report on the project of a. Strange (Lt.-Col. A.), 1873. Add. 535.

—— Report on the recent French Explorations connected with. Topley (W.), 1878.

—— Report of Select Committee. Channel Tunnel, 1883.

—— Shall we have one? Forbes (Lord), 1883. Add. 500.

—— Submarine Channel Communication. Page (T.), 1870.

—— Submarine railway between England and France. Reports. Geological Explorations. Lavalley, 1875–77.

—— Ventilation of the Channel Tunnel Railway after completion. Low (W.), 1873.

—— —— Difficulties of ventilation. Gachassin-Lafitte, 1881.

—— Proposals, 1858. Plans for a submarine communication. Anonymous, 1858, p. 52.

—— Plans of Proposed British and Continental Railway tunnel *viâ* Dungeness, etc. Remington (G.), 1866.

—— Tunnel uniting the railways of France and England. Marès, 1867.

—— Submarine tunnel between France and England. Martin and Le Gay, 1869.

—— Proposed Cast-iron tube for carrying a railway across the Channel. Bateman and Revy, 1869.

—— International Floating Tunnel. Young (E. W.), 1869.

English tunnelling on underground railways as well as under rivers and arms of the sea. Forchhammer, 1884.

Feather River, proposed Eocene Tunnel at Big Bend on the north fork of the. Barry (J. D.), 1880.

Forth, near Queensferry, practicability of a tunnel under the. Forth, 1806.

Hauenstein tunnel on the Swiss Central Railway. Construction. Pressel and Kauffmann, 1860.

Hoosac Tunnel, 1873. Hoosac. Reports. Troy and Greenfield Railroad, 1863, '67, '73.

Hudson River Tunnel. Burr (S. D. V.), 1885; Smith (William S.), 1882.

Japan, Imperial Railways of. Japan, 1891.

Lyttelton Tunnel, New Zealand. Canterbury, N.Z.

TUNNELS—*continued.*

Lyttelton Tunnel. Condition of the Tunnel on the line of the Lyttelton and Christchurch Railway. Report, 1889. PATERSON (T.), 1852.

Mersey Tunnel Railway. Programme for the ceremony of opening, 1886. MERSEY Tunnel.

—— Mersey Tunnel, its geological aspects. READE, 1885.

—— Shield Tunnelling in loose ground under water pressure, with special reference to the Vyrnwy Aqueduct Tunnel under the Mersey. DEACON (G. F.), 1892–3. Add. 495.

Michigan (Lake) tunnel to be built under the bed of. CHICAGO, 1887.

Mont Cenis. FIGUIER, 1872. Ventilation. FRESCOT, 1881.

New York, East River, Tunnel under. Report. JACOBS (C. M.), 1894. Add. 511.

St. Gothard Railway, 1872–77. Experiences made on the flowing of compressed air in long metal conduits for the transmission of force. STOCKALPER (E.), 1879.

St. Gothard Tunnel. FAVARO, 1874; KÖNYVES-TOTH, 1880; RZIHA, 1875. Geology. SAINT-GOTHARD, 1881.

Sapperton Tunnel on the Thames and Severn Canal. TAUNTON (J. H.), 1874.

Severn Tunnel. RICHARDSON (C.), 1875.

—— Construction and difficulties, 1872–87. WALKER (T. A.), 1888, '91.

—— Report of an accident in the use of dynamite during its construction. SEVERN Tunnel, 1879.

Simplon. COLLADON, 1880; VAUTHIER (L. L.), 1875, p. 369.

—— Construction and working of Railway. STOCKALPER (E.).

—— Geological study. HEIM, etc., 1883.

—— Opening before the Chambers. VAUTHIER (L. L.), 1881, p. 368.

—— Plans, Reports, etc. SIMPLON, 1866, 1882.

—— Influence of subterranean heat. LOMMEL, 1880.

—— Simplon, St. Gothard, and Lukmanier. LOMMEL, 1865.

Thames Tunnel. THAMES Tunnel, 1825.

—— Report to the Académie des Beaux Arts. SCHLICK (B.), 1826.

—— Brunel's letter in reply to a congratulatory letter on its completion. BRUNEL (Sir M. I.), 1842. Add. 488.

—— Documents relating to. THAMES Tunnel, 1829.

—— Sketches of the works, etc. THAMES Tunnel, 1827, '28, '39.

—— Intended Tunnel beneath the River Thames. CLARKE (C.), 1799.

—— Proposed dry tunnel from Gravesend to Tilbury. DODD, 1798.

TUNNELS—*continued.*

Thames Tunnel. From Rotherhithe to Wapping.
BRUNEL (Sir M. I.), 1823, 1833, 1838

—— Letter to the proprietors. BRUNEL (Sir M. I.), 1829

Tyne, projected dry tunnel under the, to join North and South Shields. DODD, 1797.

Vosburg Tunnel, description of its construction.
VOSBURG Tunnel, 1887.

Washington Aqueduct Tunnel. Report.
WASHINGTON Aqueduct Tunnel, 1889.

TURBINES.

Steam. Parson's Condensing Steam Turbine. EWING, 1892.

Water. *See* WATER-WHEELS.

TURF. Sale of, in Europe. DULLO, 1861

TURNERY.

Art of the Turner. DESORMEAUX, 1824.

Lathes and Turning, simple, mechanical and ornamental.
NORTHCOTT, 1876.

Manuals. BERGERON (L. E.), 1792, 1816; BERGERON, 1792–96. App. 547; DESSABLES, 1831.

Mechanical Manipulation. HOLTZAPFFEL (C. and J. J.), 1843–84.

Metal Turning. ANONYMOUS, 1890, p. 49.

TURNPIKE GATES.

Construction, hanging and fastening of Turnpike gates.
PARKER (T. N.), 1804, 1816.

TURNPIKES.

Turnpike Acts for England. BALFOUR (D.), 1876.

Turnpike Roads, London. Reports of Commissioners, 1827–72.
LONDON, p. 270.

Turnpike Trusts of the Metropolis. Report from the Select Committee, 1825. LONDON, p. 269.

U.

UNDERPINNING. *See* BUILDINGS.

UNIVERSITIES, COLLEGES, SCHOOLS, ETC.

Construction of buildings for Elementary Schools. PRINETTI and Girola, 1887.

Faculty of Engineering. DYER (H.), 1890.

Function of Universities. HAVEY-BISHOP, 1881.

Organisation of an Industrial College for Artisans. Notes. TWINING (Thomas), 1851.

Requirements of Science. DYER (H.), 1889.

Science curriculum. DYER (H.), 1890.

Aberdeen. Calendar, 1893, etc. ABERDEEN.

Adelaide. Calendar. ADELAIDE, 1888.

Aachen. Royal Technical High School. AIX, 1870, 1879.

—— Rheno-Westphalian Polytechnic School. AIX, 1870, 1875, 1879.

Barbados, Codrington College. Reports. CODRINGTON, 1886–88.

Battersea Polytechnic Institute. Prospectus of Technical Day School for boys. BATTERSEA Polytechnic Inst., 1894. Add. 484.

Belfast, Queen's College. Calendar, 1885. BELFAST.

Berlin Royal Technical High School. BERLIN, 1881, etc., p. 128.

Berne, Swiss Polytechnic. Programme. ÉCOLE, 1888, etc.

Birmingham. Mason Science College. Calendar, 1881, etc. MASON Science Coll.

—— —— Faculties of Arts and Science. Syllabus of Day Classes, Session 1893–4. MASON College, 1893. Add. 519.

Bologna, Royal School of Application for Engineers. BOLOGNA, 1881–88.

Bombay. Calendars, 1872–73, etc. INDIA, p. 113.

Bradford Technical College. BRADFORD.

Brazil, Naval School. BAPTISTA, 1882.

Bristol, Merchant Venturers' School. BRISTOL, 1886–89.

UNIVERSITIES, COLLEGES, SCHOOLS, ETC.—*continued.*

Bristol University College. Calendar. BRISTOL, 1878, etc.

—— Meeting of Governors. BRISTOL, 1885.

Calcutta. Calendars, 1872–73, etc. INDIA, p. 115.

California University. Addresses at the Inauguration of Martin Kellogg as President.
CALIFORNIA University, 1893. Add. 490.

—— Building. GILMAN (D. C.), 1872.

—— University Addresses. CALIFORNIA University, 1881, 1892.

—— Bulletins. CALIFORNIA University, 1874, etc.

—— By-Laws of the Board of Regents.
CALIFORNIA University, 1880.

—— Reports of the President and Secretary to the Board of Regents. CALIFORNIA University, 1884, etc.

—— Library Bulletin. CALIFORNIA Univ., 1880, etc.

—— Register. CALIFORNIA Univ., 1887, etc.

—— Progress and condition of the University.
CALIFORNIA Univ., 1875.

—— Alumni Association. CALIFORNIA Univ., 1893.

—— Report on Physical Training. HARRISON (G. F. E.), 1888.

Cambridge. Calendar, 1871, etc. Report on the Library. 1882.
CAMBRIDGE University.

Canada, Military College. Syllabus of course of Instruction.
CANADA, 1885, p. 217.

Cape Town. Cape of Good Hope University. Calendar
CAPE of Good Hope, 1889.

Cardiff. University College of South Wales and Monmouth. Calendar and Prospectus. CARDIFF.

Carlsruhe. Polytechnic School. Programme.
CARLSRUHE, 1868.

Chemnitz. Royal High Schools. Programme. CHEMNITZ, 1867.

—— State Technical Institute. Programme.
CHEMNITZ, 1886, etc.

Cooper's Hill. Royal Indian Engineering College. Calendar, Correspondence in reference to the establishment, etc.
COOPER'S Hill, 1871.

—— Class and Prize List, 1894. Examination Papers, 1893–4.
COOPER'S Hill. Add. 494.

Cork. Queen's College. Calendar. CORK, 1851, '80, etc.

Crystal Palace. School of Practical Engineering. Lists, etc.
CRYSTAL PALACE, 1886–87.

Dartmouth College. Thayer School of Civil Engineering and the Medical College. Catalogue for the year 1893–4.
DARTMOUTH Coll. Add. 495.

Delft. Polytechnic School. Annales, Programme, &c. DELFT.

UNIVERSITIES, COLLEGES, SCHOOLS, ETC.—*continued.*

Delft. Royal Academy of Instruction of Municipal Engineers. HUET (A.), 1889.

Dresden. Royal Saxon Polytecnic School. Library, Publications, Programme, Statutes, etc. DRESDEN, 1864, etc.

—— Technical School. HÜLSSE, 1853.

Dublin. Calendar, 1868, etc. DUBLIN

—— Queen's University, Ireland. Regulations, 1868. QUEEN'S University.

—— Royal College of Science for Ireland. Directory of educational arrangements, etc. ROYAL Coll. of Science for Ireland, 1869, '85.

—— Royal University of Ireland. Calendars, 1886, etc. ROYAL University of Ireland.

Dulwich College. Endowed Schools Commission. ADAMS (J. R.), 1873.

Dundee. University College. Calendars. DUNDEE, 1885, etc.

Durham. College of Science. Calendars. DURHAM, 1883, etc.

—— University. Calendar. DURHAM, 1886, etc.

Edinburgh. Calendars, Programmes, etc. EDINBURGH University.

—— Tercentenary celebration. SELLERS (C.), 1884.

—— Heriot-Watt College. Calendar, 1889, etc. HERIOT-Watt.

—— Scotch Universities of Edinburgh, Glasgow, St. Andrew's, and Aberdeen. Evidence received by the Commissioners appointed to visit them. SCOTLAND, 1837, p. 175.

—— St. Andrew's University. Calendar. ST. ANDREW'S University, 1887, etc.

Folkestone. Currie Schools Prospectus. CURRIE, 1892.

France, etc. Silk, Horological and Mining Schools of France, Germany and Switzerland. Report to Lancashire County Council. LANCASTER, Co. of, 1893. Add. 514.

Freiberg. Royal Saxon School of Mines. Programme, 1886, etc. FREIBERG.

Galway. Queen's College. Calendars, 1886–90. GALWAY.

Ghent. Reports, Programmes, etc. Civil Engineering, etc. GHENT, 1878, etc.

Glasgow. Civil Engineering and Mechanics. Synopsis of Lectures. GORDON (L. D. B.), 1847, '49.

—— Extension of the Curriculum of Arts. GAIRDNER, 1865.

—— Election of Sir Robert Peel as Lord Rector. CLELAND, 1837

—— Calendar. GLASGOW, 1865, etc.

—— Syllabus of Lectures on Civil Engineering and Mechanics. GLASGOW, 1841.

UNIVERSITIES, COLLEGES, SCHOOLS, ETC.—*continued.*

Glasgow. College of Science and Arts, afterwards Glasgow and West of Scotland Technical College. Syllabus, Calendars, Report, etc. GLASGOW, 1844, etc.

Greenwich. Royal Naval College. Report of the Establishment Committee, 1877, and 12th and 14th Annual Reports, 1887–9. ROYAL Naval Coll.

Hainaut, Mining School of. Programme. ÉCOLE Provinciale, 1863, 1887.

Halifax, N.S. Dalhousie College. Calendar. DALHOUSIE College, 1887–89.

Hanover. Royal Technical High School. Programme. HANOVER, 1868–91.

Huddersfield. Technical School. Calendar, 1889–90. HUDDERSFIELD.

Ithaca, N. Y. Cornell University. PERKINS (F. C.), 1891.

—— Report of the President, Library, Register, 1871, etc. CORNELL.

Kingston, Canada. Queen's College and University. Calendar, 1883, etc. Examination Papers, 1886, etc. KINGSTON.

Lambeth Parish Half-Time School, 1887. NORWOOD.

Lampeter. St. David's College. Memoranda. ST. DAVID'S Coll., 1887–89.

Lausanne. Academy. Technical faculty. Programmes, 1870, 1888–89. LAUSANNE.

Leeds. Yorkshire College. Calendars, Annual Reports, etc. YORKSHIRE College, 1885, etc., and 1887–88.

—— Engineering Society. Annual report, etc. YORKSHIRE Coll. Engineering Society, 1889.

Lennoxville. University of Bishop's College. Calendar, 1886, etc. LENNOXVILLE.

Liége. School of Arts, Manufactures, and Mines. Programmes. LIÉGE, 1864.

—— Laboratory of Applied Mechanics of the technical faculty. Report, 1893–4. DWELSHAUVERS-DERY (V. A. E.), 1894. Add. 498.

Lincoln. School of Science. Syllabus, 1887, etc. LINCOLN School.

Liverpool. University College. Department of Engineering. Syllabus, Sessions 1886–7, etc. Calendar for the Session 1887–8, etc. Annual Report of the Council, 1894. UNIVERSITY Coll., Liverpool.

London. City of London College. Calendar. CITY of London, 1885, etc.

—— College of Preceptors. Calendar. COLLEGE, 1887, etc.

UNIVERSITIES, COLLEGES, SCHOOLS, ETC.—*continued.*

London. Gresham University. Minutes of Evidence and Report of Commissioners on the Draft Charter for the proposed. GRESHAM University, 1894. Add. 504.

—— Imperial Institute School for Modern Oriental Studies. IMPERIAL Institute, 1890. Add. 509.

—— King's College. Calendars, 1879, etc. KING'S College.

—— Normal School of Science and Royal School of Mines. Prospectus, 1886–91. NORMAL School.

—— Royal College of Chemistry. Address to agriculturists and Statements of Council. ROYAL College of Chemistry, 1845.

—— Royal College of Surgeons. Calendar for 1870, 1876–8 and 1886. ROYAL College of Surgeons.

—— Royal School of Naval Architecture and Marine Engineering. Annual, 1871–3. ROYAL School of Naval Architecture.

—— Trinity College. Calendar for 1883–4, etc. TRINITY College.

—— London University. Calendars, 1874, etc. Guide 1891–92. Examination for Bachelor of Laws, 1841, for Bachelor of Medicine, 1841. LONDON University.

—— Election. CHADWICK (Sir E.), 1867, p. 236.

—— Statement of facts, 1831. PATTISON, 1831.

—— University College Calendar, 1869–70, etc. Faculties of Arts and Laws and of Science, etc., 1889–90. Catalogue of Books in the Library, 1879. Distribution of Prizes, 1842–47. Proceedings at Annual General Meetings, 1847–52. UNIVERSITY College, London.

Maastricht. Municipal High School. Programme, 1867, etc. MAASTRICHT.

Madras. College of Engineering. Calendar, 1890, etc. INDIA, p. 122.

—— University Calendar, 1886–87, etc. INDIA, p. 125.

Manchester Grammar School. Account of. BAILEY (W. H.), 1889.

—— Owens College. BRITISH Association, 1887, p. 182.

—— —— Calendar, 1886, etc. Essays and Addresses, 1874. OWENS College.

—— —— Owens College: its foundation and growth, etc. THOMPSON (J.), 1886.

—— Technical School. Syllabus 1886–87, etc. Report, 1889. Visit to Continental and English Technical Schools, 1891. MANCHESTER, p. 314.

—— Victoria University Calendars, 1883–84, etc. MANCHESTER, p. 314

UNIVERSITIES, COLLEGES, SCHOOLS, ETC.—*continued.*

Manitoba University. Calendar, 1890–91. MANITOBA.

Massachusetts Institute of Technology. Department of Civil Engineering. Report, 1892. MASSACHUSETTS Institute of Technology. Add. 519.

Melbourne. Working Men's College. Prospectus, 1890. Report, 1889. MELBOURNE.

—— University Calendar, 1882–3, etc. MELBOURNE University.

Michigan. Report. ANGELL (J. B.), 1887.

—— Calendar, 1874–75, etc. MICHIGAN.

Milan. Royal Technscal High School. Programme, 1863–64, etc. MILAN.

Montreal. McGill University Calendar, 1862–63, etc. McGILL University.

—— Formal Opening of the Engineering and Physics Building, 1893. McGILL University.

—— New Applied-Science Buildings, 1890. McGILL University.

Munich. Royal Technical High School. Proceedings. MUNICH.

—— Polytechnic School. Programme, 1868–69. MUNICH.

New Brunswick. Calendar, 1877, etc. NEW Brunswick.

New Haven. Yale College. Sheffield Scientific School. Annual Reports. YALE College, 1870, etc.

New York. Rensselaer Polytechnic Institute. Handbook of Information. Courses in Civil Engineering and Natural Science, Work of Graduates, 1826–1893. RENSSELAER Polytechnic Institute. Add. 530.

—— —— Record, Register, Report, RENSSELAER Polytechnic Institute, 1824–90.

Nottingham. University College. Calendar, 1885, etc. NOTTINGHAM.

—— New Technical Schools. Opening, 1893. NOTTINGHAM.

Oxford. Calendar, 1871, etc. Catalogue of graduates, 1772. Student's Handbook, 1891. OXFORD University.

Paris. L'École des Ponts et Chaussées. AUCOC, 1879–85.

Philadelphia. Pennsylvania University. PENNSYLVANIA University, 1885.

Poona College of Science. Prospectus. INDIA, p. 129.

Putney College, education at. COWIE, 1850.

—— College for Civil Engineers. Programme. COWIE, 1844.

Roorkee. Thomason Civil Engineering College. Lectures. MEDLEY and Glover, 1865.

UNIVERSITIES, COLLEGES, SCHOOLS, ETC.—*continued.*

Roorkee. Annual Examination, 1863. Examination papers. Calendar, 1870–71, etc. Catalogue of Library, 1863, '69. Professional Papers, 1853–81. Reports of the Principal for the official years 1863–70. THOMASON Civil Engineering College.

Sheffield, Firth College. Prospectus. SHEFFIELD, 1886.

—— Technical School. Prospectus. SHEFFIELD, 1891. Metallurgical Department. THWAITE (B. H.), 1892, p. 312.

—— —— Journal. SHEFFIELD, 1891.

Sibpur. Civil Engineering College. Calendar, 1893. INDIA, p. 130.

Southampton. Hartley Institution, proposed extension as a local University College. HARTLEY Institution, 1887.

Tokio, Imperial University of. Calendar, 1880–1888. TOKIO.

—— Journal of the College of Science. TOKIO, 1886, etc.

Toronto School of Science. Prospectus, 1884. ONTARIO.

—— School of Practical Science. Prospectus, etc. TORONTO, 1886, etc.

—— Trinity College. Calendar. TORONTO, 1887, etc., 1894.

—— University. Additions, etc. to Curriculum and regulations respecting the holding of local Examinations, 1885. Department of Dentistry, 1888. Faculty of Arts, Law, and Medicine, 1885 and 1888. Medical Faculty College and Register of Graduates, 1887–9; and Benefactors of the University after the Great Fire, 1890. Calendar, 1887–9. TORONTO.

—— Victoria University Calendar. Session 1886–7, etc. TORONTO.

Turin. Building for the Silvio Pellico elementary school. PRINETTI, 1888.

Ulster, Queen's College. Letter with reference to the mathematical professorship in. YOUNG (J. R.), 1850.

United States. Lehigh University. Publications, Register, etc., 1879, etc. LEHIGH University.

—— Polytechnic, etc., Schools. Notes on. WARREN (S. E.), 1866.

Utrecht. State Municipal High School. Programme of Lessons for 1867–8. UTRECHT.

Washington College, Lexington, Va. Catalogue. WASHINGTON College, 1868.

—— Public Schools: 20th and 22nd annual reports of the Board of Trustees of. WASHINGTON, 1865, '67.

Wellington. New Zealand University Calendar, 1887, etc. Canterbury College Calendar, etc., 1888, etc. NEW ZEALAND, p. 413

West Point Military Academy. History. BOYNTON (E. C.), 1871.

UNIVERSITIES, COLLEGES, SCHOOLS, ETC.—*continued.*

West Point Military Academy. Register of officers and graduates, 1802–50. CULLUM, 1850.

Windsor, Nova Scotia. King's College Calendar, Sessions 1874–75 to 1890–91. WINDSOR, Nova Scotia.

Zurich. Federal Polytechnic School, Prospectus, 1889. Organization and Progress, 1878. Programme for the Summer terms, 1868–9, 1886–91. Regulations, 1873. ZURICH.

URANIUM. Complete purification of oxide of uranium. HERSCHEL, 1832, p. 51.

V.

VACCINATION.

Report on the discovery of Vaccine Inoculation, 1801.
PARLIAMENTARY .. Papers, p. 519.

Madras. Report on Vaccination, 1855. INDIA, p. 125.

VALUATION.

Art of Valuing rents and tillages. BAYLDON (J. S.), 1827.

Valuation of Carpenters' and Joiners' Work depending on prices and quantities of materials used. BROWNING (H. B.), 1847.

Valuation of Property, corporeal and incorporeal.
CURTIS (C. E.), 1891.

VALVE (SLIDE). *See* STEAM ENGINES (General References).

VAPOUR (AQUEOUS). Formula for the force of vapour in the atmosphere. APJOHN, 1845.

VAPOURS.

Characteristic equation of. ANTOINE (C.), 1892.

Coefficient of the dilatation of. ANTOINE (C.), 1885.

Compressibility of Vapours. ANTOINE (C.), 1886.

Heat of Vapours. LUBBOCK (Sir J. W.), 1840.

Maximum Elasticity and density. MORTON (A.), 1876.

Relation between the volume, pressure, and temperature of Vapours. ANTOINE, 1890.

Saturated Vapours, expansion of. RANKINE (W. J. M.), 1866.

—— Relations of Pressure, Temperature, and Volume in.
UNWIN (W. C.), 1886, p. 359.

—— Experiments made to ascertain the Specific Volumes of the saturated vapours of Water Bisulphide of Carbon Ether, etc.
PEROT (A.), 1892.

Temperature of Vapours. ANTOINE, 1886, 1887, 1888.

Tension of. ANTOINE, 1891.

VAULTS. Dimensions of. BRAET, 1882.

Form and strength of Vaults and Domes. HAGEN (G.), 1874.

VAULTING (ROMAN AND GOTHIC). Application of masonry to the construction of. DOBSON, 1842.

VENTILATION. Stalbe, 1878; Vallance (J.), 1821. Ventilation of Buildings. Anonymous, 1835, p. 50; Butler (W. F.), 1873; Joly, 1869.

Centrifugal Blower, Experiments on a, delivering Air into the Atmosphere at large. Isherwood, 1889.

Compressed air, System by means of. Gossi, 1891.

Dwelling Houses. Edwards (F.) jun., 1868.

—— In tropical cities, pure air in. Frick, 1889.

Grant's (Donald) petition respecting his Patent. Report. Grant (D.), 1848.

Heated gases, Ascent of, through flues in Rooms. Gilbert (D.), 1822.

Hoey's patent system for the Ventilation of large halls. Hoey (D. G.), 1891.

Houses, Ships, Tunnels, and Mines. Norton House and Ship Ventilator, 1882. Norton Ventilator Co.

Lectures. Leeds (L. W.), 1868, '76.

Mechanics. Rafter, 1878.

Public, domestic, and agricultural structures. Burn (R. S.), 1850.

Punkahs, Working of, in India by coolie labour and by machinery. Parsons (Hon. R. C.), 1878.

Question of Ventilation considered. Westbrook (R. A.), 1861.

Rational Ventilation. Deny, 1883.

Science of Ventilation as applied to inhabited interiors. Hoey (D. G.), 1891.

Ships. New method for extracting the foul air out of. Sutton (S.), 1745. App. 578.

Steam (Jet of). Action of, as a motive power. Longridge, 1852.

Steamships, Ventilation of. With reference to the removal of explosive and foul gases from bulk oil steamers. Terry (S. H.) and Flannery, 1894. Add. 535.

Theatres. Joly (C.), 1876.

Theory and practice. Reid (D. B.), 1844.

London. Barclay, Bevan, Tritton & Co.'s Bank, Lombard Street. Lee and Hoey, 1891.

—— Houses of Parliament. Houses of Parliament, 1852, '66, '86.

See also Warming and Ventilation.

VENTILATORS.

Application and construction. Sabloukoff (A. de), 1841.

Mines, Gaols, Ships, etc. Hales (S.), 1743.

Report on mechanical Ventilators. North of England Institute, 1884.

VIADUCTS.

Examples of Bridges and Viaducts. HASKOLL, 1867.

Handbook, Viaduct Works. MAYNARD, 1868.

Iron Viaducts for Highways. WADDELL (J. A. L.), 1889.

Iron Highway and Railway Viaducts. ANONYMOUS, 1885, p. 46.

Iron and Steel. Specifications. BOUSCAREN, 1887, 1890. General Specifications for Railway Bridges and Viaducts for spans up to 300 feet. CANADA, 1892. Add. 490.

Iron Railway Viaducts of the line of Commentry to Gannal. NÖRDLING, 1870.

Piers of great Viaducts in metallic frame work. NÖRDLING, 1864.

Stone Viaducts. DUBOSQUE, 1881, '87.

Adelaide and Nairne Railway Viaducts. MAIS, 1882.

Bordeaux Iron Viaduct. Paludote Viaduct. REGNAULD, 1869.

Boyne Viaduct. Evidence before Committee of the House of Commons. GALBRAITH, 1858.

Calder, South, on the Wishaw and Coltness Railway. Tables of experiments on the Timber arch. MACNEILL, 1842.

Crumlin Viaduct, Monmouthshire. Handbook. MAYNARD, 1862.

Dinting Vale Viaduct, on the Sheffield and Manchester Railway. JEE, 1846.

Erdre (L'). DUPUY, 1879.

French Viaducts. FRANCE, 1870, p. 435; WATSON (William), Ph.D. of Boston, 1892.

Holborn Viaduct. BARLOW (P. W.), 1860.

—— From Fetter Lane to Old Bailey. Report on the projected. WHISHAW (T.), 1835.

Hungerford and Wellington Street Viaduct. Report, 1869. HUNGERFORD.

Indre. Stone. Indre Viaduct. FONTENAY (T.), 1852.

Landore Viaduct on the South Wales Railway. FLETCHER (L. E.), 1856.

Manchester, Iron Viaduct at, on the joint Station of the London and North Western and Manchester, Sheffield and Lincolnshire Railways. JEE, 1854.

Missouri River at Bellefontaine Bluffs, Mo. Specifications for a Viaduct in the North approach to the Bridge across. MORISON (G. S.), 1892. Add. 521.

Moldau. HUSS, 1889.

Newcastle and North Shields Railway, Arched Timber Viaducts on the. GREEN (B.), 1846.

Staithes Viaduct. DIXON (J.), 1875.

Tay, New, Viaduct. BARLOW (W. H. and C.).

VIADUCTS—*continued.*

Torrington and Marland Light Railway. Photographs of the Viaducts. TORRINGTON and Marland Light Railway, 1882. Add. 536.

Varragas Viaduct. PONTZEN, 1875.

See also BRIDGES.

VIBRATION of Surfaces. BIOT, 1800.

Vibrations of heavy bodies in cycloidal and circular arches. GILBERT (D.), 1823.

VICTUALLING OF TOWNS. OSTHOFF, 1894.

VISCOSITY.

Viscosity or internal friction of air and other gases. MAXWELL (J. C.), 1866.

Viscosity of Solids. BARUS, 1891, 1892.

VISION (DISCOVERIES RELATING TO). PRIESTLEY, 1772.

VOLCANOES. SCROPE (G. P.), 1825 and 1872; ZURCHER (F.) and Margollé, 1884.

Action, Volcanic, phenomena of. READE, 1890.

Energy, Volcanic, attempt to develop its true origin and cosmical relations. MALLET (R.), 1873.

Saturated Steam, the motive power. PEACOCK (R. A.), 1882.

Water, Agency of, in Volcanic Eruptions. PRESTWICH, 1886.

What they are and what they teach. JUDD, 1888.

What is the cause of activity? PEACOCK (R. A.), 1877.

America (Central). Volcanic Phenomena. DUTTON (C. E.), 1891.

California, Northern. Volcanic eruption and peculiar lava. DILLER, 1891.

Etna, Eruption of, 1879. Report. ETNA.

New Zealand. Volcanic Eruptions, 1886. NEW ZEALAND, p. 413.

Vesuvius, Sketches of. AULDJO, 1832. Notice of eruption. LOBLEY, 1868. Eruption in 1872. PALMIERI, 1873.

—— Mount Vesuvius, Mount Etna, etc. HAMILTON, (Sir W.), 1773.

VOLUNTEER Engineer Corps for India. Formation, establishment. MOLESWORTH, 1885.

VOLUNTEERS. Regulations for the Volunteer force, 1863. PARLIAMENTARY..Papers, p. 519.

W.

WAGES.

Foreign Work and English Wages. BRASSEY, 1879.
In 1873. BRASSEY, 1873.
Report on the relation of Wages in certain Industries to the cost of Production, 1891. PARLIAMENTARY..Papers, p. 519.
Trades Unions and Strikes. BLACK (A.), 1859.

WAGGONS. Fox's System of solid-pressed Steel Waggon and Carriage Frames. NURSEY, 1889.
Tilting Apparatus for emptying Waggons at Railway Termini. THOMSON (James), F.R.S.E., 1843.
See also RAILWAYS (Carriages) and (Rolling Stock).

WALLS.

Dymchurch Wall in the County of Kent, Report on. WALKER (James), 1837, p. 394.
Notes on Walls. BRAET, 1882; MAYNIEL, 1808; SLACKE (W. R.), 1875.
Retaining Walls, Practical Designing of. JACOB (A.), 1867.
—— Practical ironwork and retaining walls. SMITH (Chas. G.), 1875.
—— Retaining Walls. WRAY (H.), 1880.
—— Text Book. MERRIMAN, 1892.
—— Surcharged and different forms of retaining walls. TATE (J. S.), 1873.
Sustaining Walls. BRAET, 1882; CRUGNOLA, 1883; DUBOSQUE, 1881, '87; GOBIN, 1884.
—— Geometrical constructions to determine their thickness under various circumstances. WOODBURY (D. P.), 1854.

WAR. GIRARDIN, 1859.
Defence of fortresses. CARNOT, 1812.
Index of Publications on Methods of Communication in the Field. FISCHER-TREUENFELD, 1889.
Memoirs on Cæsar's Belgic Campaigns. ROULEZ (J. E. G.), 1833.
Napoleon's Campaigns. NAPOLEON I., 1842.
Premiums, War, and the underwriting, 1805 and 1808. DANSON, 1893.
Real cause of the defeat of the English flotilla on the Lake Erie. BENTHAM, 1814.
France. War Depot. FRANCE.
Russian War. Report, 1854–56. MCCLENNAN.

WAR—*continued.*

Russian War. Plans of attack on Cronstadt, Sweaborg, and Helsingfors. HOSEASON, 1857.

Schleswig-Holstein. The Prussians in North Schleswig. FREELAND, 1867.

Spain and the war with Morocco. ROSS (O. C. D.), 1860.

WAR OFFICE.

Manufacturing departments' better control and management. ELLIOTT (W. J.), 1887.

Organisation. GALTON, 1868.

WARMING AND VENTILATION. ANONYMOUS, 1825, p. 57; ARNOTT, 1838; CONSTANTINE, 1881; JONSTORFF, 1890; MILLS (J. H.), 1890; PERKINS (E. E.), 1856, 1862; PRICE (H. C.), 1844; REID (D. B.), 1844; RITCHIE (R.), 1855; RUTTAN (H.), 1862; SCHUMANN (F.), 1877; TOMLINSON (C.), 1867; TREDGOLD (J.), 1824, '25, '36; TRÉLAT (E.), 1886; TRÉLAT (E.) and Somasco, 1889; WOLFF (A. R.), 1890, '93.

Air, Attempered. WHITWELL (S.), 1834.

Air, Warm, by self-acting suction power. DRYSDALE and Hayward, 1876, '90.

Ancients, ventilation and warming of buildings as practised by. RITCHIE (R.), 1851.

Apartments, Experimental inquiry into the modes of warming and ventilating. URE (A.), 1836.

Apparatus for warming and ventilating buildings. PERKINS (A. M.), 1840.

Gas, Heating by. DENNY, 1881; FICHET and Perissé, 1880; STEGMAN, 1881.

—— —— Application to Mining Industry. STEINMANN, 1868.

—— Gas and Electricity as heating agents. SIEMENS (Sir W.), 1881, p. 198.

—— Ventilation by. SIMMANCE, 1889.

History and art. BERNAN, 1845.

Hospitals. MORIN, 1865.

Hot air stoves, Warmth and Ventilation by means of. VALLIN (M.), 1869.

Hot water. HOOD, 1837, '44, '55, '69, '79; JONES (Walter), 1890.

—— Distribution. BEIELSTEIN, 1889.

—— Guide for fixing Hot Water Apparatus. ELDRIDGE, 1881.

—— Hot water heating on the low pressure system. FAWKES, 1882.

—— Answer to a report on Perkins' system of warming building with hot water. PERKINS (A. M.), 1841.

—— Evidence upon the extension of Perkins' patent for his hot water apparatus. PERKINS (A. M.), 1845.

WARMING AND VENTILATION—*continued.*

Hot water. Reply to Mr. Perkins' "Answer" to the report to Manchester Assurance Company. DAVIES (J.) and Ryder, 1841.

—— Treatise showing the advantages of the improved system of heated water circulation. RICHARDSON (C. J.), 1839.

MS. Letters on Warming. TREDGOLD (T.).

National Heating Company. Central Station Heating and Power Supply System. Report, 1888. NATIONAL HEATING.

Prall system of supplying Heat for cooking, heating, and steam power. ISHERWOOD, 1887.

Principles. BILLINGS (J. S.), 1884.

Private houses. LABARTHE, 1869.

—— New Method of warming and purifying the air in private houses and public buildings. CHABANNES, 1815.

Report of Commissioners, 1857. PARLIAMENTARY..Papers, p. 481.

Report of Committee of the House of Commons. INMAN, 1836.

Residences, etc. WILLETT (J. R.), 1893.

Rooms and buildings. MEIKLEHAM, 1845.

Steam heating for buildings. BALDWIN (W. J.), 1882.

Steam from a central source. BARTLETT (J. H.), 1884.

—— District Steam Supply for heating buildings. BARTLETT (J. H.), 1884.

Systems, different. BOYCE, 1824.

—— Rival Systems. BELL (A. N.), 1884; TROWBRIDGE (W. P.), 1884.

Temperature and air in the house. TRÉLAT (E.), 1886.

Ventilation. MORIN, 1861, '63; TEAGUE (W.), junior, 1882; WALMISLEY (A. T.), 1884.

—— Centrifugal Ventilating Machines. MURGUE, 1883.

—— Chimneys, Ventilation of Rooms, construction of. WILLAN (R.), 1794.

—— Effects of ventilation produced by the chimneys of rooms. MORIN, 1863.

—— Ventilation by Heated Chimneys and Ventilation by Fans. Their relative economy. TROWBRIDGE (W. P.), 1886.

—— Forced Ventilation, conducting air by, and regulating the temperature in buildings. CHABANNES, 1818.

—— Halls of Audience, Ventilation of. BRIGGS, 1881.

—— Suction Bellows and Ventilators. Testud de Beauregard system. TESTUD de Beauregard (F.), 1865.

—— Teague's patent improved Ventilating Apparatus. TEAGUE (W.), junior, 1882.

—— Theory and Practice. WOLPERT (A.), 1880.

—— Treatise on Ventilation. RITCHIE (R.), 1852.

WARMING AND VENTILATION—*continued.*

Ventilation. Useful hints. WALKER (William), 1850.

Bridgeport school house. Warming and Ventilating. BRIGGS, 1880.

London. Custom House *v.* the Council Chamber of the Royal Institute of British Architects. Ventilation. SEDDON (J. P.), 1882.

—— Houses of Parliament. Ventilation, heating and lighting. HOUSES of Parliament, 1866; KEITH, 1894.

—— South Kensington Museum, heating and ventilation. SOUTH Kensington Museum, 1869.

Munich. Heating Stations. BUNTE, 1879, '82.

Paris. Palais de Justice, Paris, heating and ventilation. PARIS, p. 459.

Rio de Janeiro, Ventilation of the City of. Report on John Frisk's proposition. RICHARDSON (Sir B. W.), 1889.

United States. Ventilation of the Hall of Representatives and of the south wing of the Capitol of the United States. BRIGGS, 1876.

See also VENTILATION.

WASHHOUSES. *See* BATHS AND WASHHOUSES.

WASTE. Waste. SIEMENS (Sir W.), 1882, p. 199.

WASTE LANDS. Remarks on the utility of improving the Waste Lands in the Kingdom. ANONYMOUS, 1787, p. 54.

WATCHES. *See* CLOCKS, CHRONOMETERS, ETC.

WATER (GENERAL REFERENCES). HEUSINGER von Waldegg, 1877, '83. Add. 507; THOMPSON (S. N. C.), 1879.

Art of raising Water. BERTHOT, 1893; DUCRAST, 1809.

Chalk Water. COOPER (C. H.), 1884.

Collection, Storage, Purification and Examination of. BOLTON (Sir F.), and Franklin, 1886.

Composition, collection and distribution. PARRY (Joseph), 1881.

Conducting, elevating and distributing, means of. GENIEYS, 1829.

Conservation. WRIGHT (J.), 1882.

—— For agricultural and pastoral purposes. MACIVOR, 1870.

Distribution of Water in Houses. JOLY, 1869.

—— Principles and formulas to be employed in questions respecting. DARCY, 1856.

Divining Rod. LATIMER (C.), 1879.

WATER (General References)—*continued.*

Domestic Use. O'Doherty, 1862.

Effect of a rapidly increasing supply of Water to a Stream on the flow below the point of supply. Francis (J. B.), 1889.

Engine for elevating Water by the rotation of a vertical rope. Laudriani, 1782.

Engineering (Water). Slagg (C.), 1888.

Evaporation of Water. Alexandre (P.), 1879; Fitzgerald, 1886.

Forms of Water in Clouds and Rivers, Ice and Glaciers. Tyndall (J.), 1872, 1883, p. 334.

Friction of Water against Water. Hawkins (J. I.), 1843.

Gas and water review. Periodical Publications, p. 15.

Ground Water, Influence of, upon health. Latham (B.), 1891.

Heat developed by water when agitated. Rennie (G.), 1857.

Hydraulic Tables. Flynn, 1883, '85.

Hydrotechnics. Furk (F. E. T.), 1820; Schlichtung, 1889.

Law of Water. Stewart (C. E.), 1889.

Legislation. Franquet (Bertram), 1864.

Machines and Apparatus for the raising of Water. Morin, 1863.

Means of conducting, raising and distributing. Dupuit, 1854.

Measurement of running water. Boileau (P.), 1854; Fontana (C.), 1696; Michelotti, 1767; Prony, 1802.

Mode in which Water is affected by a body moving in it. Isherwood, 1889.

Movement of Water. Cardinali, 1821–45; Carmignani, 1766–68; Dupasquier, 1840; Dupuit, 1848, '63; Eytelwein, 1826; Girard (P. S.), 1804; Hagen (G.), 1870, '76; Mariotte, 1718.

Movements and Scour action of water at obstructions. Stratton (J. P.), 1873.

Potable Water. Boudin, 1854; Dumas (J.), 1857; Ekin, 1880; Kemma, 1888.

—— Sanitary Notes. Bischof, 1879.

—— Putrescent Organic matter in. Bischof, 1877.

Remarkable properties of water and other fluids, with special reference to steam boiler explosions. Bowman (J. E.), 1845.

Resistance, comparative, offered to bodies moving through Water at different velocities. Booth (H.), 1856.

—— Frictional Resistance of Water on a surface. Froude (W.), 1874.

—— Resistance of Water to a vessel passing through it. De Penning, 1889.

Resistance of Water to the movement of bodies. Bourgois, 1860.

Retarded, Water, from boiling. Examination of the phenomena. Walther-Meunier (H.), 1884.

WATER (General References)—*continued.*

Right of, from the rock of the Mill of Craigie, 1818–20. Moncrieff (Sir T.) *v.* Ramsay.

Science of water. François, 1663

Spring Water. Piefke, 1886.

—— And river water. Dupasquier, 1840.

Stability of Brick Conduits. Fteley, 1883.

Storage. Denton (J. B.), 1866, 1874; Fitzgerald, 1892.

Studies on Water. Boudin, 1854.

Tank for storing drinking Water. Pringle (R.), 1884.

Transporting power of Water. Heywood (J. M.), 1869.

Underground Water. Bird (C.), 1887.

—— Rights. Judgments. Ballard (M.) *v.* Tomlinson.

Utilisation of Water, International Congress on the, Paris, 1889. Boehmches; Jacquelin.

Australia, South. Utilization. Chamier, 1886.

Brussels. Water in the Brussels Conglomerate. Gernaert, 1891.

Buenos Aires. Kyle, 1873.

Hamburg. Underground Water. Voller, 1893. Add. 538.

London Basin. Water in the Chalk beneath the London Clay. Hayward, 1887.

London. Dumont (A. and Georges), 1874.

Lyons and Paris. Dumont (A.), 1862.

New South Wales. Water Conservation. Reports of Commissioners, 1885–87. New South Wales, p. 404.

—— Progress Report, 1891. New South Wales, p. 404.

Mines. Dumont (A. and Georges), 1874.

Paris. Couche, 1885; Dumont (A. and Georges), 1874; Figuier, 1862.

—— Temperature of underground Waters, 1879. Durand-Claye, 1880.

Switzerland, Management. Salis, 1884.

Thames Store Water. Worsley (Sir W.), 1866.

WATER (Analyses, Impurities and Purification).

Analysis. Hehner, 1878.

—— Impurities, purification, etc. Water Analysis. Wanklyn (J. A.) and Chapman, 1874, 1885.

—— Analysis of lake and river Waters. Burlington, N. J., 1866.

Micrographic Analysis. Fabre-Domergue, 1890.

—— for sanitary purposes. Frankland (E.), 1880.

—— Qualitative and Quantitative Chemistry of fresh water and mineral water. Lefort, 1859.

Chemical methods in use for the determination of Organic matter in potable water. Mallet (J. W.), 1882.

WATER (Analyses, Impurities and Purification)—*continued.*

Composition and Properties of drinking water and water used for general purposes. Voelcker (A.), 1875. Add. 538.

—— Composition of certain Mine Waters. Phillips (J. A.), 1873.

—— Composition of Water. History of the Discovery. Halliwell (J. O.), 1840.

—— Correspondence of James Watt on his discovery of theory of the Composition of Water. Watt (James), 1846.

—— Variations in the composition of river waters. Andrews (T.), 1875.

Experiments on purifying contrivances for the water of towns. Lindley (W. H.), 1889.

Filtration of Potable Water. Nichols, 1879.

—— Reservoir and Tank Filtration by Clark's process and by filtration generally. Porter (J. H.), 1888.

Impurities and Purification. London and General Water Purifying Company, 1865. London and General Water; London and General Water, 1873. Add. 516.

Lead. Medical cautions against the use of lead in the construction of pumps. Lambe, 1803.

Microscopical examination, and chemical examination. Hogg (J.), 1874; Macdonald (J. D.), 1883.

Micro-Organisms in Water, and the bacteriological methods employed in their investigation. Frankland (P. and Mrs. P.), 1894. Add. 501.

Polarite, Purification of Water by, 1893. International Water and Sewage Purification Co. Add. 511.

Purification. Alkaline permanganates. Condy, 1862.

—— Carbonate of Lime, Iron and other impurities. Removal of the, from hard Water, by Porter-Clark processes. Porter (J. H.), 1876.

—— Industrial Purifier, Porter's. Porter (J. H.), 1892.

—— International System of Water Purification. Cadell (H. M.), 1891. Add. 489.

—— Iron, application of. Devonshire, 1885.

—— —— By means of Anderson's revolving iron Purifier. Devonshire, 1888.

—— —— Purification of Water by means of metallic Iron. Devonshire (T. E.), 1890. Add. 496.

Purification Process. Spence (P.) and Sons, 1882.

Revolving Purifier for treatment of potable water by means of metallic iron. Anderson (W.), 1891.

Sand filtration. Samuelson, 1882.

Softening and purifying. Porter-Clark process. Porter (J. H.), 1877, 1879.

Water Pollution. Koenig, 1887.

WATER (Analyses, Impurities and Purification)—*continued.*

Baltimore. Purification of the Waters of the Upper Harbor or Basin. McAlpine, 1873.

Berlin. Examination of potable water, 1885–6. Koch (R.), 1886.

Huel Seton Mine. Composition of Waters of a Salt Spring in. Phillips (J. A.), 1873.

London. Tables of the general properties of the Water supplied by the Metropolitan Water Companies. Letheby, Odling and Abel, 1867.

—— Consumption of impure Water the cause of Cholera epidemic, 1856. London, p. 255.

Medway. Microscopical and chemical examination of the filtered water of the River Medway. Lankester and Campbell, 1858.

Moorfoot Hills. Analysis. Playfair (L.), 1863.

Thames. Microscopical examinations of the organic matters and solid contents of water supplied from the Thames and other sources. Lankester and Redfern, 1852.

—— Microscopical examination. Thames and other waters. Redfern, 1852.

Watford. Chemical report on the quality of various specimens of water from chalk springs. Lankester and Redfern, 1852.

Yellowstone National Park, U.S. Analyses of Waters. Gooch and Whitfield, 1888.

See also Filtration.

WATER (Discharge of, over Weirs). Determination of flow (Bazin). Keller (K.), 1889, '90. Tables of Discharges in open channels and over weirs. Parker (J. L.), 1870.

WATER (Discharge of, through Apertures or Orifices). Discharge from orifices, notches, weirs, pipes and rivers. Tables. Neville (J.), 1853; Neville (J.), 1875. Add. 522; Poncelet and Lesbros, 1832.

WATER (Flow of, in Rivers, Canals, and Streams).

Carriage of mud, sand and gravel by running water. Vauthier, 1885.

Experiments on the flow of water. Fteley and Stearns, 1883.

Flow in small channels. Hering (R.), 1878.

Flow in uncovered channels. Darcy and Bazin, 1865.

Formula. Ganguillet and Kutter, 1889.

Form to which the surface of water flowing out at one end of a long rectangular trough tends. Velocity and volume. O'Connell, 1871.

Measurement and flow of, in ditches. Bowie (A. J.), 1884.

WATER (Flow of, in Rivers, Canals, and Streams)—*continued.*

Motion of Water in Natural Watercourses. Pleukner, 1879.
Moving of boulders by flowing water. Hochenburger, 1886.
Resistance of floating bodies in a running stream. Colthurst, 1863.
Rivers, rate of flow in water in. Brunings (C.), 1798.
Running Water, solution of problems relative to the permanent movement of. Bélanger, 1828.
Theory of the flow of water in channels. Gale, 1893; Gordon (R.), 1875; Prony, 1804.
Velocities and Discharges of a watercourse. Vandersin, 1892.
Velocity of Water. Gordon (R.), 1878. Add. 503.
Velocity of flowing Water. Brunings, 1798.
Water flowing and spouting. Treatise on the movement and measure of. Varignon (P.), 1725.
Arram Beck, inexpediency of a permanent overflow of 100 yards. Chapman (W.), 1804, p. 241.
Rhine. Water-gauge in Baden. Baden, 1880.

WATER (Flow of, through Conduits).

Calculation of conduits of water. Pellis, 1870.
Loss of charge in Water through conduits. Flamant's formula. Sauvage (E.), 1893.
Warming of water in conduits. Forchheimer, 1888.

WATER (Flow of, through Pipes). Bidone, 1836; Lampe (C. J. H.), 1872; Mossotti, 1824.

Experiments on the flow of water in a 48-in. pipe. Stearns (F. P.), 1885.
Flow of water through orifices, over weirs and through open Conduits and pipes. Smith (Hamilton), junior, 1886.
Formulas, New, for calculating the flow of water in pipes and channels. Foss (W. E.), 1894. Add. 501; Frank, 1886.
—— New Formula. Thrupp (E. C.), 1887.
—— Formulas for the flow of water in pipes. Unwin (W. C.), 1886.
Hydraulic Tables showing the discharge and velocity of water and sewage flowing through pipes. Ryde (E.), 1851.
Influence of Temperature on the Motion of Water in pipes. Hagen (G.), 1854.
Movement of water in pipes. Darcy and Bazin, 1865.
Movement of water in circular pipes. Vallot (M. H.), 1888.
Movement of water in delivery pipes. Prony, 1825.
Movement of water in uncovered pipes. Prony, 1825.
Open channels, pipes, sewers, conduits. Flynn, 1886, '90.
Pipes, conduits, and orifices. Leslie (J.), 1855.
Water Pipe Discharge Diagrams. Taylor (E. B. G. M.), 1891.

WATER (Medicinal). Ilkeston. Greeves, 1833.

WATER (Mineral). *See* Mineral Waters.

WATER (Sea). London Metropolitan Pure Sea Water Household Supply. McBean and Macdonald, 1878.
Effects on metals. Andrews (J.), 1875.
Relative electro-chemical positions of wrought iron steels, cast metal, &c., in sea water. Andrews (J.), 1887.
Specific gravity and Temperature of Sea Waters. Marcet, 1819.
Supply to London. Hennell, 1879.

WATER CLOSETS.
Latrines of the East. Morse (E. S.), 1893.
London. Report on Public Urinals. Haywood (W.), 1850, p. 35.
—— Sites for Public Urinals. Haywood (W.), 1851, p. 35.
—— Underground Urinals and Water Closets. Western front of the Royal Exchange. Haywood (W.), 1885, p. 35.
—— Junction of King William Street with Gracechurch Street. Haywood (W.), 1886, p. 35.
—— Provision of Closet Accommodation for Women. Haywood (W.), 1887, p. 35.
—— Sloane Square Underground Convenience. Higgens, 1889.

WATER METERS. Browne (R. E.), 1885; Noack-Dollfus, 1883.
Bornemann, 1849. Harlacher.
Current Meters. Czerwenka (F. J. V.), 1879; Stearns (F. P.), 1883.
Hydrometry. Siemens (Sir W.), 1854–56, p. 198. Its application to the practice of civil Engineering. Stevenson (D.), 1842.
Hydrometrical Projects for regulating the waters of Bologna, Ferrara, and Romagna. Conti, 1763–66.
Letters patent for invention of an improved construction. Jopling (T. T.), 1856.
Methods and apparatus employed in measuring. Flather, 1892.
Providence, R. I. Water Meter system from 1872–'87. Weston (E. B.), 1888.
Rio de Janeiro. Trials of water meters at, in 1887. Rio de Janeiro, 1875.
Venturi Water Meter. Herschel (C.), 1888, '93.
Waste-water meter system. Deacon, 1885; Lindley (W. H.), 1885.
—— Prevention of Waste by Deacon Meters and other appliances. Leslie, 1892.

WATER POWER. *See* HYDRAULIC POWER.

WATER SPRINGS.

Form and direction of springs. BIDONE, 1824.
Origin. BARLOW (E.), 1717.
Percussion of springs. BIDONE, 1836.
Sheffield Springs. Their temperature. SORBY (H. C.), 1859.
"Water and Springs," 1557. PALISSY, 1876.
Water-bearing strata, Ealing district. BROWN (J. A.), 1882.
—— London Basin. HOPKINSON (J.), F.L.S., 1880.
—— London, Country round. PRESTWICH, 1851.

WATER SUPPLY. BINNIE (A. R.), 1878, 1887, 1891; BLAKE, 1881; BROWNE (J. H. B.), 1880; CLUTTERBUCK, 1863; COLYER, 1889; CORFIELD, 1874; FANNING, 1877, 1891; MARGGRAFF, 1879; ROBINSON (Prof. H.), 1891; TUDSBERY and Brightmore, 1893; VERNON-HARCOURT (L. F.), 1888.

Chalk. Absorbent power of Chalk, and its water contents under different conditions. ANSTED (D. T.), 1851.
—— Geological conditions affecting the question of Water supply from the chalk. WHITAKER (W.), 1884.
Chemical and sanitary standpoint. NICHOLS, 1883.
Cities and Towns, etc. HUMBER, 1876.
—— Regulation of the Supply. KEY (W.), 1884.
Constant supply. SAMUELSON (S. A.), 1882.
Country Water Supply in its hygienic aspect. PAGE (Dr.), 1876. Add. 525.
Country houses. EASSIE (W.), 1884; FIELD and Peggs, 1883; GRANTHAM (R. B.), 1874.
Daily Supply. PARKER-RHODES, 1887.
Distribution of two supplies of different quality. BECHMANN, 1891.
Domestic Filtration. DENTON (J. B.), 1879.
Domestic use. PEGGS (J. W.), 1893; WOOD (J. Tertius), 1884.
—— Supplies suited to Farms and Villages. ANDERSON (W.), 1887.
Filtration of River Waters for the supply of cities as practised in Europe. KIRKWOOD, 1869.
Geological conditions affecting the supply to houses and towns. PEYTON (J. E. H.), 1875. Add. 528. PRESTWICH.
House, every, its own Water Supply. HIBBERD, 1879.
—— Water service to houses. BAYLES, 1882.
Irrigation, Water supply and. SCOTT (J.), 1883.
Journal . . . of Water Supply. PERIODICAL PUBLICATIONS, p. 18.
Lectures. MCHARDY, 1864.

WATER SUPPLY—*continued.*

Lunatic Asylums, Drainage and Sewage Disposal for. FIELD (R.), 1892.

Maritime Towns. Water Supply. WILLOUGHBY (E. F.), 1891.

National Water Supply. Conferences, 1878, 1879. Notes on Previous Enquiries. SOCIETY for the Encouragement of Arts.

—— Handbook to Exhibition of apparatus, models, etc. SOCIETY for the Encouragement of Arts, etc., 1879.

New countries. STONE (T. W.), 1888.

New Red Sandstone and Permian Formations as sources of Water Supply for towns. HULL (E.), 1864. Add. 509.

Notes. GRANTHAM (R. F.), 1890.

Pipes. "Providence pattern" cast-iron Water pipe. Table for estimating the cost of laying. WESTON (E. B.), 1890.

—— Patent wrought-iron and cement protected pipe for water supply of cities and villages. KNIGHT-BAILEY, 1872.

—— Use of lead pipe for service pipe in the distribution of Water for the supply of cities. KIRKWOOD, 1859.

Pipes and channels for water supply. Dimensions of. FRANK (A.), 1886.

Potable Water Supply. ORMSBY, 1885.

Prospecting for Water, Well-sinking, and Boring. MANSERGH, 1882.

Purchase of water supply, with the latest statistics of water supply. SILVERTHORNE (A.), 1881.

River Water. LINDLEY (W. H.), 1889.

Rural Water Supply. HETT, 1888.

Spring Water, properties of. LAMBE, 1803.

Towns, Water Supply of. BATEMAN (J. F. La T.), 1856; BURTON (W. K.), 1894. Add. 489. LATHAM (B.), 1865; ORMSBY, 1867.

—— Water supply for towns and mill power. NEVILLE (J.), 1860–61.

—— Small towns and villages. MACASSEY, 1877; MIDDLETON (R. E.), 1889.

Transportation, Water, Status and Interest of. VIVIAN (T. J.), 1893.

Typhoid Fever in its relation to Water Supplies. MILLS (H. F.), 1891.

Underground Water Supply and river floods. DE RANCE, 1889.

Urban water-supply. BECHMANN, 1888.

Villages. BALFOUR (D.), 1883; TERRY (S. H.), 1887.

Water Boards in the United States, United Kingdom, and Canada. Statistics. EVERETT (G. A.), 1874.

Wells, Sinking and Boring. SPON (E.), 1875, 1885.

Whipple's water supply, 1888–9. WHIPPLE (F. H.), 1889.

WATER SUPPLY (PLACES).

Aberdeen Water Supply. Report. SIMPSON (J.), 1855.
Adelaide and Suburban Water Supply. Report. ADELAIDE, 1878. Add. 479.
Africa, South. BROWN (J. C.), 1877.
Aliwal, South. Proposed Water Supply. SPINDLER (H. L.), 1881.
Alleghany. ENGINEERS' Society, 1886.
America, North, Engineering in. FANNING, 1877, 1891.
Antwerp, Summer of, 1885. DEVONSHIRE (E.)
Atlanta, Georgia. Reports. HERING (R.), 1891.
Auckland. Reports. AUCKLAND, N. Z., 1860.
Augsburg. Drinking Water. KUBY, 1881.
Australia (South) Water Supply. Report by R. E. Sankey. SOUTH Australia, 1871, p. 230.
Baden. Administration. BÄR, 1870.
Bath, Report upon affording a better supply of water for. BATH, 1864. Add. 484.
Bathurst, N.S.W. BATHURST, 1877.
Battle Water Supply. TOPLEY (W.), 1884. Add. 536.
Bengal, Water Analysis in, 1867, 1868–69. INDIA, p. 111.
Berlin. SILK (A. E.), 1894. Lake Tegel. ANKLAMM, 1886.
Bermondsey. BERMONDSEY, 1872.
Birmingham. RAWLINSON (Sir R.), 1871; RAWLINSON (Sir R.) and J. P. Smith.
—— Future Water Supply. BARCLAY, 1891
Birmingham, Bradford, Leeds, Liverpool and Manchester. BIRMINGHAM, 1882, 1883.
Bombay. INDIA, 1854, '55, 70, p. 113; TULLOCH (H.), 1872. Report on the extension. AITKEN (R.), 1868. Toolsie Scheme, 1870. INDIA, p. 113. From Tulsi and Vehar Lakes. GOSTLING (D. E.), 1875.
Boston, Lincs. Act, 1846. BOSTON, Lincs.
Boston, U.S. Additional supply from Sudbury River. FTELEY, 1882.
—— High Service Pumping Engine. BOSTON, Mass., 1892.
—— Water-Meter Testing Commission. BOSTON, Mass., 1888.
Bradford. Future Supply. PATERSON (M. M.), 1885.
Brighton Waterworks. EASTON (E.), 1881.
—— Inspection of Goldstone Bottom Pumping Station. BRIGHTON, 1884.
Brisbane, Queensland. BRADY (J.), 1866. Purification and increase. BRISBANE, 1886. Reports. BRISBANE, 1866, 1880.
Bristol. Report. BRISTOL, 1846.
British Guiana and West Indies. HILL (L. M.), 1888.
Broken Hill, Sydney. Darling River and Lake Speculation scheme. BROKEN Hill, 1891.

WATER SUPPLY (PLACES)—*continued.*

Brussels. Ancient and Modern Water Supply.
VERSTRAETEN (T.), 1884.

Buenos Ayres. BATEMAN (J. F. La T.), 1871, BUENOS AYRES, 1887.

Burlington, Vermont. JUDSON, 1884.

Calcutta Water Supply. Filtration of the Hugli Water for.
WALDIE (D.), 1873, '74.

—— Official Papers, 1863–68. INDIA, p. 115.

California University. Water Supply. Report.
SOULÉ (F.), 1880.

Canterbury. PILBROW, 1867.

Canterbury Water Supply. Chemical analysis of the water from the new works at Wincheap. CANTERBURY, 1869. Add. 490.
New Water Supply. CANTERBURY, 1869. Add. 490.

Cape Town. GAMBLE, 1875.

—— Table Mountain Water Supply Company. GAMBLE, 1882.

Cardiff. Proposed additional supply from the River Taff Fawr.
CARDIFF, 1884.

Carlisle. Proposed supply from the river Eden. CARLISLE, 1830.

Charters Towers. CHARTERS TOWERS, 1887.

Chelmsford and Maldon rural sanitary districts. Report on the water supplies of the various villages and hamlets.
THRESH (J. C.), 1891. Add. 536.

Chicago. CHICAGO, 1887.

Christchurch, New Zealand. Possibility of supplying water from the River Waimakariri through the media of cylinders.
BLACKWELL (L. B.), 1879; MCLEOD, 1882.

Clevedon, Somerset. RAMMELL, 1852.

Colombo. Correspondence, 1877, '79, '81. INDIA, p. 117.

Croydon. Report. LATHAM (B.), 1871.

Delhi Waters, Analysis of, 1867. INDIA, p. 111.

Demerara. DEMERARA, 1879.

Dewsbury, Heckmondwike and Batley. Report on the practicability of obtaining a sufficient supply of water.
WICKSTEED (T.), 1856.

Dieppe. ALEXANDRE, 1884.

Dublin. BRAZILL (T.), 1854; Report of Commissioner.
DUBLIN, 1860.

Dundee. Proposed conveyance of water from Lintrathen.
BATEMAN (J. F. La T.), 1872.

Eastwood and Greasley. GANT, 1873.

Edinburgh Water Supply. EDINBURGH, 1869. Add. 498.
LESLIE (J.), 1873; RAMSAY (A.), 1863.

—— Contest between the Edinburgh and district water trustees and the ratepayers. JOHNSTON (R.), 1872.

WATER SUPPLY (PLACES)—*continued.*

Edinburgh Water Supply. Edinburgh and District Water Trustees. ADAMS (Robert), 1879 ; EDINBURGH, 1869, 1870 ; Additional Pentland Supplies, 1871. LESLIE (J.).

—— Economical plan for additional supply. EDINBURGH, 1817.

—— Lyne Water Scheme and proposed additional Glencorse storage for the purpose of keeping the Crawley pipe always full. LESLIE (J.), 1873, p. 234.

—— Manor Water Scheme, 1873. LESLIE (J.).

—— Report on different schemes proposed. LESLIE (J.), 1870–73.

—— Report respecting the improvement of Water Supply. TELFORD (T.), 1813, p. 287 ; TELFORD (T.) and Hope, 1813.

—— Statements, letter, &c. EDINBURGH, 1857, '68, '69.

Edinburgh, Leith and Portobello. Proposed additional supply from the Moorfoot Hills. STEWART (J. W.), 1869.

—— Observations on the various sources proposed for additional supplies from 1868–1874, with comparison of Moorfoot and Manor water schemes. STEWART (J. W.), 1874.

Elizabeth, Port. GAMBLE (J. G.), 1877.

England. Central and Eastern Counties Water Supply for villages, hamlets and county parishes. HULL (E.), 1876.

—— Circulation of Underground Water in the New Red Sandstone and Permian Formations of England, and water supplied to towns, etc. Reports on. BRITISH Association, 1877–91. Add. 488.

—— Secondary Rocks as a source of Water Supply for towns and districts. DE RANCE, 1878.

—— Holland and Bedford Level. ADDY, 1878.

—— Chiefly in reference to the British Islands Surface Waters. ANSTED (D. T.), 1878.

—— Return of Water Supply of large towns in England, Scotland and Ireland, 1888. PARLIAMENTARY..Papers, p. 520.

—— Statistics of Water Supply of Cities and Towns of Great Britain and Ireland. USILL (G. W.), 1881.

—— England and Wales. DE RANCE, 1882.

—— Return showing the means by which drinkable water is supplied to every urban district in England and Wales, 1879. PARLIAMENTARY..Papers, p. 520.

—— Seaside water. Examination into the character of the water supply at the watering places of England and Wales. WIGNER (G. W.), 1878. Add. 539.

Epsom Water Supply Report. HODSON (G.), 1894. Add. 507.

France. Marseilles, Toulouse, Dunkirk, Clermont Ferrand, Lyons Roubaix-Courcoing, Rouen. MARSEILLES, 1858–84.

WATER SUPPLY (PLACES)—*continued.*

Frankfort-on-Main. LINDLEY (W. H.), 1886.

Fredericton, sources of supply. KETCHUM, 1876.

Gawler, S. Australia. Report, 1878. GAWLER.

Geelong. GEELONG, 1856–71.

Georgetown, D.C. Report of the Water Board. GEORGETOWN, 1860.

Germany. Towns over 5000 inhabitants. GRAHN, 1883.

Glasgow City piping. BATEMAN (J. F. La T.), 1858; means of improvement. RANKINE and Thomson, 1852.

—— Supply of Water from Loch Katrine. BATEMAN (J. F. La T.), 1859; GORDON (L. D. B.), 1853.

—— Various schemes for supplying water. BATEMAN (J. F. La T.), 1853.

Goulburn, N.S.W. Report. GOULBURN, 1877.

Grahamstown. SPINDLER (H. L.), 1884.

Grazi-Tsaritsin Railway, Russia. Statistical Table showing cost of Water Supply on. URQUHART (T.), 1891.

Greenock. MALLET, 1831.

Guildford. PILBROW, 1867.

Hamburg. Filtration. MEYER (F. A.), 1893,' 94.

Hastings Water Supply, past and present. ELWORTHY (T.), 1894. Add. 499; Reports. HASTINGS, 1876.

Hastings. Reports. TOPLEY (W.), 1875; HASTINGS, 1859. Add. 506.

Hertfordshire. EVANS (Sir J.), 1893.

Hudson, City of, U.S. Report to the Water Commissioners. MCALPINE, 1872.

Hull. DALE (T.), 1871.

—— Additional works for supplying the town from Spring Head. DALE (T.), 1871.

Hunter River District, N.S.W. Pumping Machinery. DAVIES (H.).

Hyderabad, 1885. INDIA, p. 120.

India. PRINGLE (R.), 1891.

—— Water Supply schemes, 1889. INDIA, p. 109.

Italy. Cities and other centres of population. BETTOCCHI, 1865.

Jerusalem, Ancient and Modern. WHITTY (J. I.), 1864.

Kent, East. Deep Wells and Natural Springs. DOWKER, 1887.

King's Lynn, proposed new Water scheme. KING'S LYNN, 1893.

Kohima and Gauhati Water supply schemes and the Mhow Waterworks, 1890. INDIA, p. 109.

Köpenict. Results obtained at experimental stations in the Müggelberg in connection with supply of potable water from wells. FINTENER, 1886.

WATER SUPPLY (PLACES)—*continued.*

Lancashire and Cheshire, red rocks of. Address on the water supply in. DAWKINS (W. B.), 1876. Add. 495.

Lancashire and Yorkshire towns, supply from the lake districts of Cumberland and Westmoreland. DALE (T.), 1866.

Lausanne. MUYDEN, 1883.

Leeds. Mode of obtaining an additional and purer supply of water. FILLITER, 1866.

Leicester. Reports, 1845, '47. LEICESTER.

—— Report and analysis of the Water of the Streams in the neighbourhood. WICKSTEED (T.), 1850.

Lisbon. LISBON, 1853. Add. 515. Conditions of a provincial contract. LISBON, 1855.

Liverpool extension. DUNCAN (T.), 1866.

—— Memorandum. WHALLEY (G. H.), 1876.

—— Past and present position. WILSON (John H.), 1877.

—— Proposal for the better supplying the town and shipping of Liverpool with fresh water, 1780. LIVERPOOL, p. 247.

—— Reports. SIMPSON (J.) and Newlands, 1849; STEPHENSON (R.), 1850.

—— Wells and Water. ROBERTS (I.), 1883, p. 119.

London. BAZALGETTE (C. N.), 1884; BEVAN (G. P.), 1884; BOLTON (Sir F.), 1884, 1888; BRAMWELL, 1877; CLAY, 1849; GROVER (J. W.), 1892; HAYWOOD (W.), 1850, p. 35; HEMANS and Hassard, 1866; POND, 1879; RICHARDS (H. C.) and Payne, 1891; ROWBOTHAM (G. A.), 1879; TIDY (C. M.), 1878; WATHERSTON (E. J.), 1879.

London. London and provincial water supplies. SILVERTHORNE (A.), 1884.

—— Considerations affecting its adequacy and control. STEVENSON (E. H.), and Burstall, 1892.

—— Analysis of Waters supplied by Metropolitan Water Companies, 1877. LONDON, p. 271.

—— Artesian Well sunk by the Commissioners of Sewers in 1887–91 at New Street, Gravel Lane. HAYWOOD (W.), p. 36.

—— Report of the Board of Health on. WARREN (J. N.), 1850.

—— Reports of Board of Trade Water Examiner, 1871, 1872, 1885, etc. LONDON, pp. 271, 272, 273.

—— Examination of the alleged advantages of the schemes of the Metropolitan Board of Works, 1878. LONDON, p. 272.

—— Periodical alternations and progressive permanent depression of the Chalk Water Level. CLUTTERBUCK, 1850.

—— Report of Commissioners, 1828. LONDON, p. 273.

—— Report of Commissioners on the chemical quality of the Water Supply. LONDON, p. 273.

WATER SUPPLY (PLACES)—*continued.*

London. Minutes of Proceedings before the Committee for County Purposes, 1890. LONDON, p. 272.

—— Composition of daily samples of Water. CROOKES, Odling and Tidy.

—— Reports on daily samples of Water, 1881, etc. LONDON, p. 273.

—— Engineer's reports. BINNIE (A. R.), 1890–91.

—— Report of Examinations made before and after filtration at the Works. LONDON, p. 273.

—— Reports of the Examinations made of the Water supplied by the Metropolitan Water Companies, 1874–80. LONDON, p. 272.

—— Facts and Fallacies. TAYLOR (John), 1869.

—— Examination of the results of Dr. Frankland's Analyses, 1876–77. FRANKLAND (E.), 1878.

—— Future Supply. HULL (E.), 1867.

—— Report of Government Commission on chemical quality, 1851. LONDON, p. 272.

—— History. GLADSTONE (A.), 1884.

—— Water Inquiry. Report to Common Council from County Purposes Committee, 1890. LONDON, p. 274.

—— Water for Lodging-Houses. HAYWOOD (W.), 1852, p. 36.

—— Means for supplying the Metropolis with Pure Water. JONES (J. E.), 1841.

—— Metropolis Water Correspondence. KNIGHT (Sir H. E.), etc., 1884.

—— Metropolitan Parochial Supply Association. Case of rate-payers and consumers, 1850. METROPOLITAN.

—— Microscopical examination of the Metropolitan Water Supply, 1857. LONDON, p. 273.

—— Report to the New River Company on Napier's scheme. ROWLANDSON (T.), 1851.

—— Observations on the past and present. WICKSTEED (T.), 1835.

—— Patent for improvements in the method of constructing, laying down, and organising the main and other pipes. BRAMAH, 1812.

—— Potable Water Supply. ORMSBY, 1884.

—— Present State of the Water Supply, 1866. LONDON, p. 272.

—— Present and Future. TABBERNER (J. L.), 1850. Add. 535.

—— Supply of pure water. HASSARD and Tyrrell, 1884, '91, '92.

—— Plans proposed for supplying the Metropolis with pure water, 1840. LONDON, p. 271.

—— London and Westminster. Plan for supplying pure water. MARTIN (John), 1828.

WATER SUPPLY (PLACES)—*continued.*

London. Supply of pure water. MOFFAT, 1849.
—— Quantity of water required for its use. SIMON (Sir J.), 1850, p. 201.
—— What the Ratepayers really want the Government to do for London Water Supply. LUCAS (J.), 1880.
—— Reports on the Water Supply of the Metropolis, 1850, '56. LONDON, p. 273.
—— Return of maximum number of Houses supplied by the Metropolitan Water Companies, 1883, 1887. LONDON, p. 273.
—— Return of Notices to the London Water Companies, 1872. LONDON, p. 273.
—— Return of every public service well within the Metropolis. LONDON, p. 273.
—— Reports on sources of Water Supply, 1884. LONDON, p. 271.
—— Subways for the flow of pure water and gas into houses. WILLIAMS (John), 1828.
—— Proposed transfer to a public authority. QUICK, 1880.
—— Waters from the Bagshot Beds. EASSIE (W.), 1886.
—— Supply of Water to be obtained from Bagshot. RENNIE (G.), 1850.
—— Proposed Company for supplying water from the Colne Valley. CLUTTERBUCK, 1841, '42.
—— Plan for supplying the Metropolis with pure water from the river Colne. MARTIN (John), 1834.
—— Future supply from Lakes of England and Wales. HASSARD R., 1876.
—— Water Springs at Grays. GRAYS, 1860.
—— From the Chalk of Hertfordshire. HOPKINSON (J.), F.L.S., 1891.
—— Hertfordshire Rainfall, Percolation and Evaporation. HOPKINSON (J.), F.L.S., 1892.
—— Spring Water from the North Kent District. BARLOW (P. W.), 1850.
—— Proposed supply from the sources of the river Severn. BATEMAN (J. F. La T.), 1866.
—— Supply from the Soft Water Springs in the Surrey sands. Reports, 1851. LONDON, p. 272; NAPIER (Hon. W.), 1851.
—— Thames water. Discussion for and against its fitness for domestic use. THAMES, River, 1880, p. 297.
—— Water supply enquiry. Report on possibility of obtaining water within Thames Basin. WHITAKER (W.) and Green, 1891.
—— Filtered Thames Water and spring water from chalk strata. HOMERSHAM (S. C.), 1875. Add. 508.

WATER SUPPLY (PLACES)—*continued.*

London. Supply by means of natural filtration of the Water of the Thames. MACNEILL, 1866.

—— Supply from the Thames at Henley. HUMPHREYS (W.), 1849.

—— Unpracticability of the Henley-on-Thames project, and a letter on the supply and sanitary reform. TABBERNER (J. L.), 1847, '49.

—— Proposal for supply from the higher sources of the Thames. DENTON (J. B.), 1866.

—— Improved supply from the Thames. DODD, 1805.

—— Thames at Mapledurham as a source of supply. GORDON and Liddell, 1849.

—— Thames Valley. Plans as to Water Supply. THAMES VALLEY, 1873.

—— Supply from the Thames above Richmond. SIMPSON (J.), 1851.

—— Proposed supply from sources of the river Wye. FULTON (F. H.), 1869.

Long Eaton, Melbourne, and Castle Donnington. Underground Water Supplies. HODSON (G.), 1893.

Loughborough. Wood Brook and Black Brook Schemes. HODSON (G.), 1881.

Lowell, Mass. Report on a supply of water. LOWELL, 1869.

Lucknow City. CUNNINGHAM (A.), 1884.

Lynn, United States. Introduction of water, 1870. LYNN, Mass.

Lyons. LYONS, 1843.

Madras. Report, 1866. INDIA, p. 125.

Madura. O'SHAUGHNESSY, 1888.

Maidstone. LANKESTER (E.) and Campbell, 1858.

Maitland, Morpeth, Newcastle, New South Wales. MAITLAND, 1877.

Manchester. MANCHESTER, 1845.

—— Thirlmere Water Supply Scheme. KING and Curtis, 1878; MANCHESTER, 1878; MANSERGH, 1878. Remarks on evidence. THIRLMERE, 1878. Is Thirlmere the only source of supply? THIRLMERE Defence, 1877. Add. 536. Statement of the Thirlmere Defence Association's Case. THIRLMERE, 1877. Add. 536.

Manchester, Salford, and Stockport. Supply of surplus water. HOMERSHAM, 1848

Manchester, New Hampshire, U.S. Reports, 1872–74. MANCHESTER, New Hampshire.

Melbourne. Yan-Yean Water Supply. Cash statement, balance sheet, etc. MELBOURNE, 1878. Add. 519.

Middlesex and the Metropolis. HUGHES (H.), 1888.

WATER SUPPLY (PLACES)—*continued.*

Minster. Proposed Water Supply. Report.
VALON (W. A. M.), 1886.

Montreal. Proposed enlargement. LESAGE, 1873.

Moorfoot Hills. BLYTH, 1863.

Mulheim. FORCHHEIMER, 1893.

Munich. Commission. MUNICH, 1876–79.

Murray Flats. MURRAY River, 1878.

Naples. ABATE, 1870.

New Bedford, Mass. Report on the introduction of fresh water.
NEW BEDFORD, 1865.

—— Specifications for the construction and erection of a Condensing Beam Pumping Engine and two boilers.
NEW BEDFORD, 1866.

—— Trial of the pumping engine. NEW BEDFORD, 1870.

New South Wales. Newcastle, Maitland, and Bathurst, 1877.
NEWCASTLE, N.S.W.

New York. Aqueduct Commission. Reports, 1887, '89.
NEW YORK CITY.

—— Report for supplementing the Croton Water Supply from the Ramapo District. MCALPINE, 1882.

—— and other cities of the Hudson Valley. Reports.
FANNING, 1881, '84.

Newark, U.S. Aqueduct Board. Report on Additional Water Supply. CROES and Howell, 1879.

Newcastle-under-Lyme, 1847. STAFFORD (County).

Newcastle-upon-Tyne. LAWS and Armstrong, 1884.

—— History of Water Supply. NEWCASTLE-upon-Tyne, 1851.

Newport. CLARK (G. T.), 1850.

Norfolk, City of, U.S.A. Reports and Plans for a Supply of Water. MCALPINE, 1871.

Nottingham. Report, 1885. NOTTINGHAM.

Oomaru, province of Otago. JOHNSTON (T. M. H.), 1875.

Orange, New South Wales. Report, 1877. ORANGE, N.S.W.

Ossett, 1873, '79. PATERSON (M. M.).

—— Testing of Pipes and Pipe-Joints in the Open Trenches.
PATERSON (M. M.), 1879.

Oswego. Report on supplying the City with Water.
MCALPINE, 1866.

Oxford. CUBITT (Sir W.), 1851; PRESTWICH, 1876, 1884. Letters and Reports. OXFORD, 1885.

Pandharpur, India. BURKE (C. T.), 1880.

Paris. BELGRAND, 1875; EMMERY, 1853; HAUSSMANN, 1854; MALLET (C. F.), 1830. Commission Municipale, 1854. PARIS, p. 460. Compagnie générale des eaux, 1863. PARIS p. 460. Documents, 1858–61. PARIS, p. 460.

WATER SUPPLY (PLACES)—*continued.*

Parramatta, New South Wales. Report. PARRAMATTA, 1877.
Peshawar City. Water Supply Project, 1890. INDIA, p. 128.
Peterborough. ADDY, 1874.
Philadelphia, 1875–88. PHILADELPHIA, p. 34.
Plymouth. BEARDMORE (N.), 1848.
Pontypool. Evidence. PONTYPOOL, 1873.
Poona Cantonment. Report, 1858. INDIA, p. 129.
Poona and Kirkee. Project, 1866. INDIA, p. 129.
Providence, R.I. Report of Committee to examine sources of water supply. PROVIDENCE, 1869.
Queensland. Water Supply to various municipalities. QUEENSLAND, 1868, p. 74.
Ramsgate, 1877–90. RAMSGATE, p. 80.
Rangoon Water supply, on the Shone Hydro-pneumatic system. SHONE (I.) and Ault, 1892.
Reading. Report of Surveying Officers. READING, 1847.
Rome, A.D. 97. Frontinus on the Water Supply of. HERSCHEL (C.), 1894. Add. 507.
Rugby, Sandgate, Tottenham, St. Thomas's, Exeter, and Barnard Castle. BAZALGETTE (Sir J. W.), 1854.
Rutherglen. Report. RANKINE and Thomson, 1852.
St. Helier. Report. ST. HELIER, 1846.
St. Paul, Minn. Report of the Water Commissioners. ST. PAUL, Minn., 1888.
St. Thomas, Ontario. HASKINS (W.), 1889.
San Francisco. Report on various projects. MENDELL, 1877.
Sandgate Water Supply. Its connection with the outbreak of Cholera. Report. SANDGATE, 1855.
Sheffield, Rotheram-cum-Kimberworth and Doncaster. JACKSON (M. B.), 1866.
Simla, 1871, '72. INDIA, p. 131.
Skaneateles Lake. CROES, 1889.
Southampton Water Supply. SOUTHAMPTON, 1887 ; WHITAKER (W.), 1884.
—— Separate Water Supply for domestic and sanitary purposes. MATTHEWS (W.), 1891.
Spezia. RADDI, 1887.
Stafford. Proposed new well boring and pumping station. MARTEN (H. J.), 1876.
Swansea. RAWLINSON (Sir R.), 1868.
—— Water Supply. Report. SCOTT (M.), 1852, p. 177.
Sydney. Botany Water Shed. Capabilities. SYDNEY, 1870–76, p. 273.
—— Proposed Extension to Southern Suburbs, Hurstville and Rockdale. SYDNEY, 1890, p. 273.

WATER SUPPLY (PLACES)—*continued.*

Sydney. Reports. SYDNEY, 1855–82, p. 272.

—— Reports. Plans, Correspondence. SYDNEY, 1869, p. 273, 1877, 1877–80, 1878, 1889, 1890.

Syracuse Water Supply. Report on its sources. SYRACUSE, N.Y., 1889.

Tacoma, City of. HERING (R.), 1892.

Tasmania, N.E. Tin Mining Districts. Report on the Proposed Water Scheme. TASMANIA, 1884.

Taunton, Mass. Reports of the Water Commissioners. TAUNTON, Mass., 1887, etc.

Timaru District, New Zealand. HAAST, 1865.

Torquay. TORQUAY, 1884.

Toronto. HERING (R.) and Gray, 1889.

—— The Six-foot Wooden Conduit. MCMINN, 1888.

Tragowel Plains Irrigation and Water Supply Trust. Chairman's Quarterly Report. TRAGOWEL PLAINS, 1887.

Troy, City of, U.S.A. Water Supply. MCALPINE, 1872

—— Annual Reports of the Water Commissioners. TROY, 1858–76.

Turin. Potable water. NUVOLI, 1872.

Twickenham and Richmond. Coffer-dams used in laying the lines of water-pipes between. MUNDAY, 1855.

United States, Cities of the. ELLIOT (W. G.), 1887.

Victoria. BULKLEY, 1872; DEAKIN, 1886.

—— Works of the Coliban scheme. COLIBAN, 1889.

—— Victoria, Coliban and Geelong schemes. COLIBAN, 1871.

—— Water Supply to the Mallee. Report. VICTORIA, 1892, p. 379.

—— Reports. VICTORIA, 1887, etc., p. 379

—— Report of the Sewerage and Water Commission. VICTORIA, Australia, 1856. Add. 538.

Vienna. FOLSCH and Hornbostel, 1862.

Wanganui, New Zealand, 1873. MILLAR (John).

Warrington. Water of the Winwick area. DE RANCE, 1890.

Warsaw Water Supply. Report and Scheme. WARSAW, 1879, '90.

Warwick, Queensland. Water Supply of. WARWICK, Queensland, 1879.

Washington. Contract for completion of Washington Aqueduct. MEIGGS, 1858.

—— Report on filtration of Water Supply. SYMONS (Capt. T. W.), 1886.

Washington and Georgetown. Report, with surveys, etc. MEIGGS, 1855.

Waterbury, Conn. Report on Additional Supply. HERING (R.), 1892.

WATER SUPPLY (PLACES)—*continued.*

Westminster. CHELSEA Waterworks, 1852.
Wigan. RAWLINSON (Sir R.), 1852.
Wimbledon. HOMERSHAM (S. C.), 1877. Add. 508.
Württemberg (Kingdom of). EHMANN, 1881.
See also WATER SUPPLY (Waterworks).

WATER SUPPLY (CHARGES).

Cost of Water in thirty-two towns. LEE (W.), 1850.
Payment by Meter or by Annual Value. DOBBS, 1890.
Berlin Municipal Waterworks. Tariff and Regulations, 1878. HONG KONG.
Cowes, West, Water Supply. Scale of Charges. WEST COWES, 1887.
Liverpool. Alleged dearness and insufficiency of the Water Supply, 1845. LIVERPOOL, p. 247.
London. Bill to regulate Charges leviable by Companies, 1890. LONDON, p. 271.
—— New River Company. Charges for Water for public purposes. HAYWOOD (W.), 1856, p. 36.

WATER SUPPLY (FITTINGS, WASTE).

Waste Water prevention. LINDLEY (W. H.), 1885; MEYER (H. C.), 1885.
Waste of Water in Town Supplies. ANONYMOUS, 1886, p. 58.
Bombay. Prevention of Waste, 1887, '88. INDIA, p. 113.
Bradford. Prevention of Waste. BRADFORD, 1886.
Liverpool. Waste Water Meter. BRAMWELL, 1874.
—— Prevention of Waste of Water, restoration of constant service, and Waste Water Meters, 1873. LIVERPOOL, p. 247.
London. Constant supply. BATEMAN (J. F. La T.), 1887.
Constant Supply System. Analysis of evidence in favour of. WICKSTEED (T.), 1846.
—— Reports on the Constant Service System, 1872. PARLIAMENTARY..Papers, p. 519.
—— Constant Supply and Waste. DEACON (G. F.), 1882.
See also WATER METERS.

WATER SUPPLY (LEGISLATION).

Act for consolidating Provisions of Acts authorising the making of Waterworks for supplying Towns with water, 1847. PARLIAMENTARY..Papers, p. 519.
Collection of Local Acts relating to Water Supply and Sewerage of various towns, 1846–47. PARLIAMENTARY .. Papers, p. 519.
General Acts. REESON, 1874.

WATER SUPPLY (LEGISLATION)—*continued.*

Law. MICHAEL and Will, 1884.
Rating Water Undertakings. GRIFFITH (W.), 1887.
Transfer from private to public authorities. QUICK, 1880.
—— Report of Royal Commission, 1869. PARLIAMENTARY..Papers, p. 519.
—— Report on the Water Companies (Regulation of Powers) Bill, 1885. PARLIAMENTARY..Papers, p. 520.
Water undertakings, 1879 and 1879–90. Precedents in Private Bill Legislation affecting. STEVENSON (E. H.) and Burstall, 1891; STEVENSON (G. W.), 1879.
Tabulated abstract of Acts of Parliament relating to Water Undertakings, 1879 to 1887. BURSTAL, 1888.

Birkenhead Improvement Bill. BIRKENHEAD, 1847.
Birmingham Act, 1826. BIRMINGHAM, 1848.
Blackburn Water Act. GAINE, 1885.
Bolton Act. BOLTON, 1846.
Boston. Report of Water Board, 1888. BOSTON.
Bradford Waterworks Bill, 1869. BRADFORD.
Bristol Acts. BRISTOL, 1846, 1850.
—— Bristol Consumers Water Bill. BRISTOL, 1887.
—— Waterworks Act. BRISTOL, 1850.
Burgess Hill Water Act, 1886. BURGESS HILL.
Bury. Act, 1846. BURY.
Cardiff. Act for supplying the town and port. CARDIFF, 1850.
Cheltenham Bill, 1847. CHELTENHAM.
—— Select Committee of the House of Commons on the Cheltenham Water Bill. CHELTENHAM, 1878.
Chorley. Act. CHORLEY, 1846.
Darlington. Act, 1849. DARLINGTON.
Darwen Waterworks and Reservoirs Bill, 1847. DARWEN.
Derby Act, 1848. DERBY.
Dudley Acts, 1834, 1852. DUDLEY.
Dunfermline Waterworks Bill, 1847. DUNFERMLINE.
Dumfries and Maxwelltown Act, 1850–52. DUMFRIES; MAXWELLTOWN.
Edinburgh. Acts, 1819, 1847. EDINBURGH.
—— Waterworks Bill. EDINBURGH, 1847.
Falmouth. Waterworks Bill. FALMOUTH, 1847
Glasgow. Acts, 1806, 1808, 1846. GLASGOW.
—— Cranstonhill Waterworks. Act to improve works, 1819. CRANSTONHILL Waterworks.
—— Water Bill. Minutes of Proceedings and Minutes of Evidence, 1879. GLASGOW.

WATER SUPPLY (LEGISLATION)—*continued.*

Gloucestershire (West) Water Bill, 1884. Minutes of Evidence, etc. GLOUCESTER, County of. Add. 503.

Gorbals Act, 1846. Amending Act, 1850. GORBALS.

Hartlepool. Gas and Water Act, 1890. HARTLEPOOL.

Haverfordwest Waterworks Bill, 1833. HAVERFORDWEST.

Heywood (Lancashire) Act, 1846. HEYWOOD.

Hinckley Local Board Water Act, 1888. HINCKLEY.

Hong Kong Water Ordinance, 1883. HONG KONG.

Inverness Gas and Water Bill. Report, 1847. INVERNESS.

Kendal Gas and Water Supply Act. KENDAL, 1846.

Kent Water Bill. Select Committee, 1885. KENT Waterworks.

—— Kent Waterworks Company Act, 1850. Act for amalgamation of the North Kent Waterworks Company, 1883. KENT Waterworks.

Kilmarnock Act, 1846. KILMARNOCK.

Leeds Act, 1847. LEEDS, p. 226.

—— Act for enabling the Waterworks Company to provide a better supply. LEEDS, p. 226.

—— Waterworks Bill, 1847. LEEDS, p. 226.

Leicester Acts, 1847, '51. LEICESTER.

Limpsfield and Oxted Water Act, 1888. LIMPSFIELD.

Lincoln Act, 1846. LINCOLN.

Liverpool Acts, 1799, 1846, '49, '50, '52. LIVERPOOL, p. 247.

Liverpool Corporation Waterworks Bill, 1847. LIVERPOOL, p. 247.

Liverpool Corporation Water Bill, 1880. LIVERPOOL, p. 247.

Liverpool Watering Bill, 1843. LIVERPOOL, p. 247.

Llandrindod Wells Water Bill. Minutes of Proceedings. LLANDRINDOD, 1884.

Llandudno Act of 1876. LLANDUDNO.

London. Camberwell Bill. CAMBERWELL, 1805.

—— Chelsea. Act for extending. CHELSEA Waterworks, 1852.

—— Chelsea Waterworks Bill. Minutes of Evidence, 1852. LONDON, p. 272.

—— Position of the companies considered from a Parliamentary and legal point of view. CRIPPS, 1892.

—— Bill for a constant supply of water, 1875. LONDON, p. 271.

—— East London Waterworks Company. Extracts from Acts of Parliament, 1808. Acts, 1852. LONDON, p. 271.

—— East London Water Bills. Report of Select Committee, 1867. LONDON, p. 272.

—— East London. Report from Select Committee on Bills, 1867. LONDON, p. 274.

WATER SUPPLY (LEGISLATION)—*continued.*

London. Grand Junction Waterworks. Act for supply of water from the Thames at Hampton, 1852. GRAND JUNCTION.

—— Lambeth Act, 1848. New Source of Supply from Thames above Kingston, 1851. New Works at Seething Wells, Ditton, 1852. LAMBETH.

—— Bill to confer powers on London County Council, 1891. LONDON, p. 271

—— Water Commission Bill, 1891. Report of Select Committee. LONDON, p. 274.

—— Bill to provide for the Supply of Water by Meter for domestic purposes, 1890. LONDON, p. 271.

—— Metropolis Water Bills, 1851. Memorandum. SANITARY Association, 1852. Minutes of Evidence, 1851. LONDON, p. 272.

—— Metropolitan Water Bill, 1857. Speech before the Select Committee. WRANGHAM (D. C.).

—— Metropolis Water Bill, 1871. Reports of Parliamentary Committee. LONDON, p. 273.

—— Metropolis (No. 2) Water Bill, 1871. Report of Select Committee. LONDON, p. 274.

—— Report on Metropolis Water Bill, 1884. CONDER.

—— Water Supply Act, 1871. Abstract. LONDON, p. 271.

—— Metropolis Water Act, 1871. Minutes of proceedings before Commissioners. LONDON, 1873, p. 272.

—— Metropolis Water Act, 1871. Report. LONDON. Add. 516.

—— Impracticability of the regulations made in pursuance of the Metropolis Water Act, 1871. BENHAM, 1882.

—— Bill to amend Water (Metropolis) Act, 1871. LONDON, p. 271.

—— Metropolitan Waterworks. Purchase Bill in Parliament, 1880, Speech, etc. WATHERSTON (E. J.), 1880.

—— New River Company. Act for improvement of supply, 1852. NEW RIVER Company.

—— Bill to place Water Supply under control of a public authority, 1891. LONDON, p. 271.

—— Abstract of Report of Royal Commissioners on Water Supply, 1869. LONDON, p. 271.

—— Royal Commission on Rivers Pollution. Letters, 1872. LONDON, p. 272.

—— Royal Commission, 1893. Report, and Atlas of Plates. LONDON, p. 272, 273.

—— Report from Select Committee, 1880. LONDON, p. 272.

—— Speech before the Select Committee of the House of Commons. BECKETT (Sir E.), 1880.

Manchester. Manchester and Salford Waterworks Bill, 1847. Report from Surveying officers. MANCHESTER.

WATER SUPPLY (LEGISLATION)—*continued.*

Manchester. Manchester Corporation Waterworks Bill, 1847. Report from Surveying Office. MANCHESTER.

—— Manchester Acts, 1847, '48, '51. MANCHESTER.

—— Manchester Corporation Water Bill, 1878. MANCHESTER.

—— Manchester Water Bill, 1879. Objections to the Thirlmere scheme. FARQUHAR, 1879.

Massachusetts. Reports of State Board of Health, 1887, etc. MASSACHUSETTS.

Newcastle-upon-Tyne. Acts, 1834, 1840. NEWCASTLE-upon-Tyne.

New Jersey, U.S.A. Proposed Act for furnishing State Water Supply to the Municipalities of, 1893. NEW JERSEY, U.S.A. Add. 522.

Newport and Pillgwenlly Water Bill. Minutes of Select Committee, 1887. Report of Local Government Board, 1887. NEWPORT, Mon.

Norwich. Act, 1850. NORWICH.

Oldbury, Smethwick and West Bromwich Water Bill, 1871. OLDBURY.

Reading. Act. READING, 1851.

—— Act to enlarge the powers of the Company. READING, 1851.

Rochdale. Act for better supplying with Water the Town and Borough, 1847. ROCHDALE.

—— Rochdale Waterworks Bill. Report. ROCHDALE, 1847.

St. Helens (Corporation) Water Act, 1882. ST. HELENS, 1882.

Salford Water Supply. Act, 1850. SALFORD.

Scarborough and Falsgrave Water Supply. Act, 1845. SCARBOROUGH.

Sheffield Water Supply Act, 1845. SHEFFIELD.

—— Sheffield Waterworks Company Bill, 1864. Report. SHEFFIELD.

—— Sheffield and Lincolnshire Railway Waterworks Bill. Report and minutes of evidence. SHEFFIELD and Lincoln Railway, 1897.

Sleaford Act, for better supply of water to the town, 1879. SLEAFORD.

Southampton Public Conduits and other Waterworks. Act for maintaining them and for providing an additional Water Supply, 1850. SOUTHAMPTON.

Staffordshire Potteries Waterworks Bill, 1847, '88. Reports, Minutes of Evidence, etc. STAFFORD (County).

—— Staffordshire Potteries Acts, 1847, '49. STAFFORD (County), 1847.

Stirling. Act, 1848. STIRLING.

Stockton, Middlesborough and Yarm Water Supply Act, 1851. STOCKTON.

WATER SUPPLY (LEGISLATION)—*continued.*

Stockton and Middlesborough Corporations Water Bill. Minutes of Evidence, etc., 1876. STOCKTON.

Sunderland Water Supply Acts, 1846, '49, '52. SUNDERLAND.

Swansea Water Supply Act, 1837. SWANSEA, 1843.

Sydney Water Supply, Act for preventing its pollution, 1876. SYDNEY, p. 273.

Thirsk Water and Gas Provisional Order Confirmation Bill, 1879. THIRSK.

Torpoint and District Water Bill, 1884. Minutes of Evidence. TORPOINT.

Trowbridge and Westbury Water Bill, 1872. Minutes of Evidence. TROWBRIDGE, Wilts, 1872.

Victorian Water Conservation Act, 1881. Amending Act, 1883. VICTORIA, p. 379.

—— Reports of the Royal Commission. VICTORIA, 1885, p. 379.

Wakefield Water Bill. Minutes of Evidence, 1876. WAKEFIELD, Yorks.

Warrington Water Supply Act, 1846, and for the supply of the Townships of Latchford and Appleton. WARRINGTON, Lancs., 1846.

—— Warrington Waterworks Company. Act to authorise it to raise a further sum of money. WARRINGTON, Lancs., 1849.

Whitehaven Water Supply Act, 1849. WHITEHAVEN.

Woking Water Act, 1885. WOKING.

Wokington, Cumberland, Water Supply Act, 1883. WOKINGTON, 1883.

Wolverhampton Water Supply Act, 1845. WOLVERHAMPTON, 1845.

—— Waterworks Act, 1850. WOLVERHAMPTON, 1850.

York Water Supply Act, 1846. YORK, City of.

WATER SUPPLY (WATERWORKS). LATHAM (B.), 1867–71.

Ancient and modern. AVIGDOR, 1876.

Construction of Waterworks, and the effect of Earthquakes on Waterworks. BURTON (W. K.), 1894. Add. 489.

Engineering (Waterworks) Principles. TUDSBERY (J. H. T.), and Brightmore, 1893.

Glossary of Notes. GANGA Ram, 1891.

Inventions of Waterworks, shewing the easiest waies to raise Water higher than the spring. CAUS, 1659.

Lining a Waterworks Tunnel with Concrete. FITZGERALD (D.), 1894. Add. 500.

Reports, lectures and specifications. BINNIE (A. R.), 1873–80.

Statistics, 1883–86. HASTINGS (C. W.).

WATER SUPPLY (WATERWORKS) —*continued.*

Supply of cities and towns. HUGHES (S.), 1859, '72.
Various towns and districts. LATHAM (B.), 1871.

Adelaide. ADELAIDE, 1877–78 ; CLARK (W.), 1877.
Altona. KÜMMEL, 1893.
American Waterworks. BAKER (M. N.), 1889–90.
—— American Waterworks Association.
AMERICAN WATERWORKS ASSOC.
—— Statistical Tables. CROES, 1883–87.
Australia (South). Report of Commission appointed to inquire into the charges against the Waterworks Engineer.
SOUTH AUSTRALIA, 1867, p. 230.
—— Report from Engineer on evidence taken before the Commission on Waterworks. SOUTH AUSTRALIA, 1867, p. 230.
—— Waterworks management. Report.
SOUTH AUSTRALIA, 1868, p. 230.
Bath Waterworks, History and present state of.
BATH, 1878. Add. 484.
Belfast. BATEMAN (J. F. La T.), 1856.
—— Advisability of filtering the water now supplied.
MACASSEY, 1877.
Berlin. WIEBE (F. K. H.), 1872.
—— Plan for the erection of a new intake station on the M ggelsee. GILL (H.), 1887.
—— Müggelsee. Establishment of a new water pumping station.
GILL (H.), 1887.
Birmingham. Photographs. BIRMINGHAM.
—— Elan and Claerwen Valleys in Radnorshire, shortly to be submerged by the reservoirs for the Water Supply of Birmingham. TICKELL (R. E.), 1894. Add. 536.
Bombay Municipality Waterworks. Pawai Project. Report, etc.
TOMLINSON (S.), 1889.
Boston, Mass. Cochituate Waterworks. BRADLEE, 1868.
—— Boston Waterworks. Description.
WESTON (J. W.), 1878.
—— Waterworks Specifications, 1847–50. BOSTON.
Bradfield Inundations. Reports to the Sheffield Waterworks Company. SHEFFIELD, 1864.
Bradford. Unsafe state of the reservoirs. BRADFORD, 1866.
—— Prevention of the waste of water.
BINNIE (A. R.), 1885–86.
—— Upper Barden reservoir and conduits. BINNIE (A. R.), 1876.
Brighton. HALLETT (W. H.), 1890.
—— In 1854. SMITH (William), B.A., 1869, p. 215.
Brooklyn Pumping Engine. BROOKLYN, 1860.
—— Waterworks and Sewers. KIRKWOOD, 1867.

WATER SUPPLY (WATERWORKS)—*continued.*

Budapest. LINDLEY (W. H.), 1888.

Burlington, New Jersey. BURLINGTON, N.J., 1866.

Calcutta and Simla Waterworks. Lectures.
SMITH (William), B.A., 1884, p. 215.

Canterbury Waterworks. Chemical analysis of the Water.
HOMERSHAM, 1869.

Carlsbad. CUNTZ, 1883.

Chorley Waterworks Company. CHORLEY, 1852.

Cincinnati. History. BELL (T.), 1881.

Cologne. COLOGNE, 1875–77.

Colombo. Maligakanda Reservoir, 1887. INDIA, p. 117.

Croydon. RAWLINSON (Sir R.), 1882.

Danzig. DANZIG, 1881.

Dresden. SALBACH, 1874–75.

Dudley Waterworks Company. Report on the Waters.
MEDLOCK, 1852.

Durban Waterworks. DURBAN, 1886.

Edinburgh and District Waterworks. Reports.
HAWKSLEY and Leslie, 1872.

—— Report in the case of the magistrates *v.* the Water Company.
STEVENSON (D.), 1859.

Epsom. Analyses of samples of water.
HODSON (G.), 1894. Add. 507.

Glasgow. GALE, 1864; GLASGOW, 1853–55.

Gravesend and Milton Waterworks Company Act, 1846.
GRAVESEND.

Great Britain, larger Waterworks. LESLIE, 1792.

Greenock. Shaw's Water Scheme, and present state of the works.
THOM (R.), 1829, '31.

Halle. SALBACH, 1871.

Hamburg. FÖLSCH, 1851; HAMBURG, 1846–51;
LINDLEY (W.), 1846.

Hannover. BERG, 1880.

Harwich and Dovercourt. HARWICH and Dovercourt, 1887.

Hull. Proceedings of the Waterworks Inquiry Committee.
HULL, 1874.

India. Method of keeping Water sweet when stored in tanks, 1868. INDIA, p. 109.

Katrine (Loch). Large sluice Cocks or valves.
BATEMAN (J. F. La T.), 1859.

Kent. Supply of Water for extinguishing Fire.
KENT Waterworks.

Krefeld. SALBACH, 1881.

Lambeth. Report on works for obtaining a supply of water from the Thames at Ditton. SIMPSON (J.), 1848.

WATER SUPPLY (WATERWORKS)—*continued.*

Lancashire (South-east). Proposed Derwent Waterworks. CROOK, 1885.

Lawrence. Duty and capacity of the pumping engine. LAWRENCE, 1876.

Leeds, 1866. DRESSER.

Leicester. Report. HAWKSLEY, 1850.

—— Report on the Engine and Boiler trials at the Beaumont Leys Pumping Station, 1891. LEICESTER.

Liverpool. BELOE (C. H.), 1869 ; BELOE (C. H.), 1875. Add. 485.

—— Additional Water Supply. Vyrnwy Waterworks. Reports, 1885–89. LIVERPOOL, p. 247.

—— Corporation Waterworks. Report on the quality of the Rivington Water, and remarks on the action of hard and soft water on lead. SPENCER (T.), F.C.S., 1857, p. 236.

—— Proposed supply from Bala lake. RAWLINSON (Sir R.), 1866.

—— Vyrnwy Works. DEACON (G. F.), 1892–3. Add. 495 ; HOLME, 1886.

London. COLBURN and Maw, 1867. Hydraulia. MATTHEWS (W.), 1835.

—— Periodical drainage and replenishment of the subterraneous reservoir in the Chalk Basin. CLUTTERBUCK, 1843.

—— Plan showing position of the proposed works for supplying chalk water to London, and also the mills on the various rivers. LATHAM (B.), 1878. Add. 514.

—— East London Waterworks, Old Ford. Explanation of plates of Cornish and Boulton and Watt's Engines, erected at. WICKSTEED (T.), 1842.

—— —— Report to the Directors on the expediency, etc. of giving a constant supply. WICKSTEED (T.), 1856.

—— Grand Junction Waterworks. Impurity of the Water. GRAND JUNCTION, 1827. Report on general Condition of the Works. GRAND Junction Waterworks, 1881. Add. 503.

—— Henley and London Waterworks and Navigation. Supply of Water to London, 1848. LONDON, p. 274.

—— London Bridge Waterworks. Application for removal, 1821. Act, 1822. LONDON Bridge.

—— London (Watford) Spring Water Company. Reports, 1850. HOMERSHAM. 1852. LONDON (Watford) Spring Water.

—— London and Westminster Water Company. Invasion of the Waters of the Colne. CURTIS (C. B.), 1841. Preliminary Prospectus. LONDON and Westminster, 1840. Add. 516.

—— Reports. STEPHENSON (R.), 1840–1.

WATER SUPPLY (WATERWORKS)—*continued.*

London. Metropolitan Parochial Water Supply Association. Case of the ratepayers and consumers, 1850.
LONDON, p. 274.

—— New River Company's water. Report on its quality, made in reference to the Cholera Epidemic of 1854.
SPENCER (T.).

—— South Metropolitan Waterworks Bill. Report of the Surveying Officers. LONDON, p. 273.

—— Southwark and Vauxhall Water Company's Accounts, 1876. Acts, 1845, '52, and '86. Contract for coal, 1876. Report on the water supplied, 1871. Report of the Chief Engineer, 1876. Reports and Accounts of Directors, 1876.
SOUTHWARK and Vauxhall Water Co., 1876.

—— Waterwork companies. HALL (Sir Benjamin), 1855.

—— Analysis of the Metropolitan Water Companies, 1880, etc.
LASS.

—— Report on the terms of purchase of the Water Companies' Undertakings, May 1, 1879. FARR and Chadwick, 1879.

—— London Water Companies. Returns of Accounts, 1880–88, etc. LONDON, p. 274.

—— Metropolitan Water Companies. Statement of Accounts, 1871–81. LONDON, p. 274.

—— Supply of water by companies established on the faith of Acts of Parliament, LONDON, p. 271

—— West Middlesex Waterworks Company. Minutes of Evidence before both Houses of Parliament.
WEST Middlesex Waterworks Co., 1810.

—— York Buildings Waterworks Company. Report on, 1733–35.
YORK Buildings Waterworks Co., 1803.

Louisville Water Company. Contract and Specification for Pumping Engine No. 3, and three Fire-box Tubular Boilers.
LOUISVILLE Water Co.

Malmesbury. Description. TAUNTON (J. H.), 1887.

Manchester. BATEMAN (J. F. La T.), 1866, 1884.

Midlothian Water Company. Prospectus, 1872. MIDLOTHIAN.

Milwaukee. Trial of duty and capacity of pumping engines.
MILWAUKEE, 1875.

Montreal Waterworks. Reports. MONTREAL, 1877, '78.

Nágpúr (Ambajhari), Waterworks.
MORRIS (J. H.) and Binnie, 1872.

—— Reports, 1871, etc. High Level Extension, 1890.
INDIA, p. 126.

—— Ambajerry Water Supply. Projects, 1870. INDIA, p. 126.

Naples. ABATE, 1870.

WATER SUPPLY (WATERWORKS)—*continued.*

New Bedford, Mass. Contract and Specifications for construction. NEW BEDFORD, 1866.

Newark, N.J. Works of the East Jersey Water Company. HERSCHEL (C.), 1893.

Newcastle and Gateshead, Whittle Dean Water Company to supply. Prospectus. WHITTLE Dean Water Co., 1845.

Nismes. Scheme. BROUZET, 1840.

Norfolk, Virginia. Specifications, 1871. NORFOLK, VA.

Norwich. MYLNE (R.), 1789.

Nottingham. Report. TARBOTTON (M. O.), 1881.

Nuremburg. THIEM (A.), 1879.

Omagh Waterworks. On the cleansing of the Six-Inch Main. SWINEY (J. H. H.), 1887.

Providence, R.I. Reports. ASPINWALL, 1874; PROVIDENCE, 1871, '76–'77.

—— Cast-iron Water-pipes. Contract and specifications. PROVIDENCE, 1870.

—— Contract and specification for Sewers and appurtenances. PROVIDENCE, 1875.

—— Hope Reservoir, Providence. Contract and Specification. PROVIDENCE, 1873.

—— Loss of head affecting fire streams. PROVIDENCE, 1877.

—— Sockanosset reservoir. Contract and specifications. PROVIDENCE, 1870. Labour and materials. PROVIDENCE, 187– .

Queensland. Plans of Waterworks. QUEENSLAND, p. 74.

—— Projected Gympie Waterworks. GYMPIE, 1886.

—— Report of Board of Waterworks. QUEENSLAND, 1874, p. 74.

—— Report of Engineer. QUEENSLAND, 1878, p. 74.

—— Reports of Hydraulic Engineer. QUEENSLAND, 1886, 1890, p. 74.

Rochdale, Correspondence relating to. ROCHDALE, 1865.

St. Helens. Specifications for construction of reservoir. ST. HELENS, 1877.

Salem Waterworks transferred to the city authorities. SALEM, Mass., 1869.

Southampton Waterworks, 1290–1888. MATTHEWS (W.), C.E.

Southampton Waterworks Contracts, 1–10 (Otterbourne Works). Specifications and Conditions. SOUTHAMPTON, 1884 86.

—— Engineer's Annual report for 1891 to the Special and General Works Committee. SOUTHAMPTON.

Staffordshire Potteries Waterworks. Engineer's Report, 1872. STAFFORD. Add. 534.

Syracuse, N.Y. Report on the extent of the first works to be constructed. CROES, 1890.

WATER SUPPLY (WATERWORKS)—*continued.*

Toronto Waterworks, 1878–90. Annual Reports of the Engineer and Manager. TORONTO.

—— Enlargement and improvement. KEATING, 1893.

Vehar Waterworks Extension. A report on the Toolsee Valley as an auxiliary to Vehar. WALTON (R. G.), 1872.

Victoria. Cost of completing the Coliban Waterworks. COLIBAN, 1871.

—— Drawings and Description of Clunes Waterworks. LANGTREE, 1875.

Vienna. MIHATSCH, 1881.

Westphalian Rheinland. EGEN, 1831.

Winnipeg Waterworks Company. RUTTAN (H. N.), 1887.

Wolverhampton. Report on the 24-inch bore hole at Coxford. MARTEN (H. J.), 1876.

See also WATER SUPPLY (Places).

WATER WHEELS. ACHARD (A.), 1872; BACH, 1886; BONOLIS and Mazza, 1878; PONCELET (J. V.), 1827.

Construction and efficiency. DONALDSON (W.), 1876; LAFFINEUR, 1867.

Hydraulic Motors. BRESSE, 1876.

Lectures. UNWIN (W. C.), 1869.

Natural power of water to turn mills, etc. SMEATON (J.), 1794, 1796, p. 207.

Patent double-acting balanced pressure Water Wheel. GWYNNE, 1851.

Poncelet system. KRAFT, 1859.

Reaction Wheels. COMBES, 1843.

Scoop Wheel, designs for new and improved. AIRY (W.), 1870.

Steam Wheel or engine for raising Water. Patents, 1781, 1798, 1805. HORNBLOWER, 1855, '56.

Testing. EMERSON (J.), 1881.

Theory and construction. REDTENBACHER, 1858.

Ventilated buckets with. FAIRBAIRN (Sir W.), 1849, p. 402.

Vortex Water Wheel, Description. WILLIAMSON (Brothers), 1861.

Water wheels with float boards and buckets. MORIN, 1836, p. 375.

WATER WHEELS (TURBINES). REIFER, 1890; RIETER and Ziegler, 1876; RITTINGER; WERNER (R. R.), 1869; BONOLIS (A.) and Mazza, 1878; KAPP (G.), [1882].

American Turbine Water Wheel. SEARS (J. A.), 1872.

Best form of Turbine. CUTLER (W. H.), 1879.

Building of Turbines and Turbine Pumps. ANGSTRÖM, 1880.

WATER WHEELS (Turbines)—*continued.*

Construction of the Turbine or horizontal Water Wheel. Cullen, 1860, 1871.

Donaldson's Poncelet Turbine and Water pressure engine and pump. Donaldson (W.), 1883.

Fourneyron (Turbine). Fourneyron, 1850. Mechanical effects Poncelet, 1838.

Girard's turbine lift, Experiments. Tresca (H.), 1860.

France and Germany. Turbine and horizontal Water Wheel of. Glynn, 1848.

Horizontal Water Wheels, especially turbines, history, construction, etc. Rühlmann (M.), 1846.

Humphrey Turbine Water Wheel at the Tremont and Suffolk Mills in Lowell, Mass. Francis (J. B.), 1884.

Hydrostatic Turbines and other engines. Glynn, 1853.

Manual (Turbine) and Millwright's Handbook. Hett, 1892.

Partial Turbine or Tangential Wheel, and comparison of the efficiency of a Pelton wheel. California Univ., 1883.

Pressure Engines and Turbines. Bodmer (G. R.), 1889.

Theory of Turbines. Thurston (R. H.), 1883, p. 311.

Theory and Construction. Redtenbacher, 1844, '63.

Turbine Wheels, etc. Morin, 1838, p. 375; Trowbridge (W. P.), 1879.

Turbines of various types constructed at the Foundry, Brigg, etc. Hett, 1887.

WATERFALLS. Trollhätta, Sweden. Cataracts and canal. Skjöldebrand (A. F.), 1804.

WATERSHEDS. Cleveland subterranean. Steavenson (A. L.), 1892.

WATERWAYS. · *See* Canals, Inland Navigation, Rivers.

WATERWORKS. *See* Water Supply (Waterworks).

WATTLES. Cultivation of Wattles. Wattle-backs. Maiden, 1890.

WAVES.

Action of waves on Sea-beaches and Sea-bottoms. Hunt (A. R.), 1884, '87.

Action of Waves upon a ship's keel. Rankine (W. J. M.), 1864.

Artificial rolling of "Mytho." Bertin, 1880.

Atlantic and German Oceans. Experiments on the force of their waves. Stevenson (T.), 1845.

WAVES—*continued.*

Construction and principle of a wave screen. CALVER, 1858.

Denudation and deposition by the agency of Sea Waves. HUNT (A. R.), 1889.

Effect of atmospheric pressure on. GREENWOOD (W. N.), 1890, '94.

Evidence of the Skerries Shoal on the wearing of fine sands by waves. HUNT (A. R.), 1887.

Experiments at Holyhead on the Transit velocity of waves through the local rock formations. MALLET (R.), 1861, '62.

Influence of Oil on Waves. CLOUÉ, 1887; MILLAR (W. J.), 1893; ROTTOK, 1888.

Long Waves. KELLER (K.), 1884.

Making, Wave, resistance of Ships by length of parallel middle body. FROUDE (W.), 1877.

Motion, Wave. HAUGHTON (B.), 1886.

—— Of the Sea. CIALDI, 1856, '60, '66, '72; TESSAN, 1866.

Motor, Wave. ROWE (John A.), 1888.

Motor. Duffy's Wave Motor as a source of Power for various purposes. DUFFY, 1886.

Movement. BREMONTIER, 1809; EMY, 1831.

Percussion, Wave. HAUGHTON (B.), 1887.

Propagation of Waves. BIDONE, 1820, 1823, 1824, 1829, 1836; CORNAGLIA, 1884; DARCY and Bazin, 1865.

Reports to the British Association at Bristol, 1836, 1842–43. RUSSELL (John S.).

Rivers of uniform depths. HAGEN (G.), 1862.

Rolling. BERTIN, 1874.

Theory of the Waves öf the Sea. HAGEN (G.).

Tides, propagation of motion. BOTTONE, 1878.

Wave of Translation in the oceans of Water, Air, and Ether. RUSSELL (John S.), 1885.

Waves which travel along with ships. RANKINE (W. J. M.), 1868.

Wave and Vortex Motion. CRAIG (T.), 1879.

WEAVING.

Art of. BROWN (A.), 1887.

Air, compressed, in the patent Pneumatic Loom. PAGE (T.), 1864.

Berlin Exhibition, 1889. Shuttle arrangements in weaving machines. MÜLLER (E.), 1889.

Construction of Power Loom. BROWN (A.), 1887.

Patent for improvements in self-acting temples for Looms. CHETHAM (W.), 1883.

WEIGHING MACHINERY. EMERY (A. H.), 1884.
Apparatus for Weighing. ADAMS (H.), 1889.
Fairbanks' Patent Weighing Machines. FAIRBANKS, 1840.
Observations on Weighing Machines.
DEACON (W.), 1807. App. 553.

WEIGHTS AND MEASURES. *See* MEASURES, WEIGHTS, AND MONEY.

WEIRS.
Back-water of weirs. MACONCHY (G. C.), 1893. Add. 517.
Computation of the quantity of water flowing over Weirs.
FRANCIS (J. B.), 1872.
Construction of, for the preservation of rivers. PIRON, 1876.
Damming of great rivers. GIBBS (Joseph), 1862.
Discharge of Sluices and Weirs under various heads.
MACONCHY (G. C.), 1893–4. Add. 517.
Experiments on the discharge of Water by overfalls or Weirs.
BLACKWELL (T. E.).
Flow of water over. BAZIN, 1888.
Flow of water over submerged Weirs. FRANCIS (J. B.), 1884.
Movable Weirs. CHANOINE, 1855.
Movable Weirs on rivers. GAUDARD, 1886.
Needle weirs. KLETT (J.), 1874.
Retention of gravel from gorges of torrents. BRETON, 1867.
Weirs and locks for canalisation of rivers.
BEAUDEMOULIN, 1860.
Brentford proposed weir. Report to Conservators of the Thames.
COODE (Sir J.), and Calver, 1873.
Clyde at Glasgow. DEAS, 1886.
France. Mulatiere weir. PASQUEAU, 1879, 1881.
France and Germany, Self-acting Weir on the rivers of.
PEARSON (J. B.), 1878.
Scheldt (Eastern), Influence of the weirs of, on the navigation of the Western Scheldt. SCHELDT (River), 1866.
Seine. Suresnes Weir. BOULÉ, 1889.
Severn. Water-worn and pebble-worn stones taken from the apron of the Holt-Fleet Weir. MARTEN (H. J.), 1891.
Spree. Weirs near Charlottenburg. MOHR (E.), 1885.
See also DAMS, SLUICES.

WELDING.
Dynamo-electric current applied to the fusion of refractory metals.
SIEMENS (Sir W.), 1881, p. 198.
Welding and Uniting Metals. SUTHERLAND (W. S.), 1874.

WELLS. HAGEN (G.), 1863.
Bored Wells or Artificial Fountains, Geological and Physical considerations on the cause of the gushing out of water from. THURY (Viscount H.), 1829.
—— Norton's Patent Tube Well. NORTON (J. L.), 1867.
—— Bore-holes in the new red sandstone. BOULT (J.), 1880.
—— Sinking and boring Wells, with geological considerations and examples of wells executed. SPON (E.), 1875, 1885.
Digging of Wells. NORDENSTRÖM, 1893.
Source. KOHL (B. E.), 1884.
Study of well waters. Report of Experiments made in the Rothamsted laboratory. WARINGTON (R.), 1887.
Swallow-holes and Dumb-wells. THOMPSON (Beeby), 1887.
Use of iron in lining. Société Cockerill at Seraing. ANONYMOUS, 1880, p. 50.
Tube-wells. KNAUDT & Co.
Well-digging, boring and pump works, etc. SWINDELL (J. G.), 1849, '60.
Barley, Herts, Water level in a deep Chalk Well at, 1864–86. FORDHAM, 1888.

Bristol, Clifton and the Hot Wells. DONNE, 1831.
Dublin, Trinity College. Chemical constituents of the Well Waters in and around. APJOHN (J.) and Leslie, 1869. Add. 481.
Essex well-sections. WHITAKER (W.), 1886–92.
Hampshire well-sections. WHITAKER (W.), 1889.
Hampstead Brewery, Section of a Well at. GROVER (J. W.), 1878.
Hertfordshire well-sections. WHITAKER (W.), 1885, '90.
Kent, Depth. BLAND, 1870.
Liverpool. Wells and Water. ROBERTS (I.), 1883, p. 119.
London and Liverpool. Infiltration of Salt Water into Wells. BRAITHWAITE, 1856.
—— On the yield of Wells sunk in the Chalk in the central portion of the London Basin. EASTON (E.), 1876. Add. 498.
—— Hozizontal Wells for supplying London with pure Water. LUCAS (J.), 1874.
—— List of wells and borings in. WHITAKER (W.), 1867.
Massachusetts, District of. Driven Wells. ANDREWS (W. D.), 1882–84.
New South Wales. Construction of Public Tanks and Wells, 1888. NEW SOUTH WALES, p. 404.
Royston. Water level in a deep Chalk Well at Odsey Grange, 1878–88. FORDHAM, 1890.
Rugley Wood. Boring for Water in, and at Thorntree Well. LUCAS (J.), 1885.

WELLS—*continued.*

Sheerness, Harwich and Landguard Fort. Well sinking at. PAGE (Sir T. H.), 1797.

Somerset, etc. Deep-well borings in. WINWOOD (H. H.), 1893.

Somersetshire wells. Notes on. WHITAKER (W.) and Woodward, 1893.

Surrey Wells and their teachings; with sections of wells and deep borings. WHITAKER (W.), 1886.

WELLS (ARTESIAN). CATON, 1874; GARNIER (F.), 1822, p. 558; GARNIER (F.), 1826.

Artesian Boring. BOULTBEE, 1891.

Drilling and boring. DARLEY, 1884.

—— Negative Artesian Wells or absorbing bored Wells. BRUCKMANN, 1855.

Grenelle. History of the Wells of. AZAÏS (H.), 1843. Add. 483.

—— Geology of ground and description. GRENELLE, 1841, '43. Add. 504.

—— Artésian well of Grenelle. REY, 1844.

Houndsditch, Artesian Well in Stoney Lane. Report on the Analysis of its water. SAUNDERS (W. S.), 1891.

Louvain. Note on the Artesian Wells sunk at the Workshops of the Grand-Centrale-Belge. BIHET (O.), 1876. Add. 485.

New Lodge, near Windsor Forest. Boring at. HULL (E.), 1894.

New South Wales and Queensland. Notes on Artesian Water in. DAVID (T. W. E.), 1894. Add. 495.

—— Report on Artesian Boring, 1891. NEW SOUTH WALES, p. 404.

Oxford, St. Clement's. PRESTWICH, 1876.

Southampton. BUCKLAND, 1844.

Tottenham Court Road. On the section of Messrs. Meux & Co.'s Artesian Well in, with notice of the well at Crossness and of another at Shoreham, Kent. PRESTWICH (J.), 1878. Add. 529.

Trafalgar Square. Artesian Wells. Analysis of the Water. ABEL (Sir F. A.) and Rowney, 1848. Add. 479.

Victoria Artesian Wells. Report of the Government geological surveyor. VICTORIA, 1857, p. 379.

WHALE FISHERY. Proposal for re-establishing the British Whale Fishery. ENDERBY, 1847.

WHARVES.

Brisbane extension of wharfage. BRISBANE, 1878.

Landport. Act for Construction of a Wharf and other works. Borough of Portsmouth, 1883. LANDPORT.

New South Wales. Woolloomooloo Bay. Wharfage accommodation. Report, Minutes of Evidence, etc. WOOLOOMOOLOO Bay, 1888–9.

WHEAT. *See* CORN.

WHEELS.

Broad High Wheel Carriages. Utility and Advantages of. WICKHAM (M.), 1755.

Broad Wheels. Scheme for improvement of. WHITWORTH (R.), 1767.

Effect on the roads of Carriage Wheels with rims of cylindrical and of conical shape. CUMMING, 1809.

Conical and Cylindrical Wheels, Wheel carriages. DEACON, 1808, 1810

Cylindrical Wheels. Letter on. CUNNINGHAME (W.), 1811. App. 553. Use on Railways. RANKINE (W. J. M.), 1842.

Impropriety of High Wheels. Observations on. BESANT. App. 548.

Inclined Plane Wheels. Their theory and properties described. SHELDRAKE (T.), 1811.

Mechanics as they relate to wheel machines. BIGLAND (W.), 1797. App. 548.

Schaffer's Wheel, a substitute for Horses in the traction of vehicles. SCHAFFERS (V. F.), 1888.

Teeth of Wheels. WILLIS (R.), 1838. App. 581. Application to Millwork, etc. BUCHANAN (R.), 1808. App. 550.

—— Best shape for Teeth in Wheels. IMISON, 1787.

—— Misdrawing and restoration of the teeth. KELLER (K.), 1889.

—— Shape of Teeth of Wheels, pinions, etc., for the various purposes of machinery, mill-work, clock-work, etc. CAMUS (C. E. L.), 1733, 1806. App. 551.

—— Forms of Teeth of Wheels. AIRY (Sir G. B.), 1825. App. 543

Toothed Gearing. CROMWELL, 1884.

Treatise on the Teeth of Wheels, Pinions, etc. CAMUS, 1806, 1837.

Wheel-teeth. A new theory. SANG (E.), 1852.

See also CLOCKS AND WATCHES; TIRES for Wheels.

WIND MOTORS. Properties, Power, and Application of the Æolian Engine. MEDHURST, 1810.

WIND PRESSURE. GRAHAM (R. A.), 1883; KERNOT (W. C.), 1893. Add. 513.

Railway Structures. Report of Committee on the question of Wind pressure, 1881. PARLIAMENTARY..Papers, p. 509.

Roofs, Wind pressure on. Memorandum. UNWIN (W. C.), 1874.

Stability of structures in regard to. CAMPBELL (F. A.), 1886.

WINDING ENGINES.
Eichenhauer (A.), 1877.
Observations on. Lupton, 1875.
Recent improvements in Winding Machinery. Havrez, 1875.
Winding Engine, with self-acting variable expansion. Page (W.), 1877.

WINDMILLS.
Modern American Systems. Azamburu, 1888.
Natural power of wind to turn mills, etc. Smeaton (J.), 1794, 1796, p. 207.
Sutton's patent gravitated sails for Windmills. Hesleden, 1807.
Theory and Practice of Windmills. Wolff (A. R.), 1876.
Vertical and horizontal, comparative advantages of. Beatson, 1798.
Windmill as a Prime Mover. Wolff (A. R.), 1885.
Windmill Blades, Best Angles for. Wolff (A. R.), 1876.
Windmill pumps. Report on competitive trials at Willowmere Agricultural Show, April, 1885. Stewart (T.), 1885.
Windmills. Wolff (A. R.), 1880.

WINDOWS.
Window Duties. Anonymous, 1844, p. 42.
Window the source of light in a house. Trelat (E.), 1862

WINE.
Manufacture. Dini, 1865.
Phylloxera at Berkeley, U.S. Hilgard, 1885.
Wine of Saint-Raphael. Gramond de Lavigne, 1878.

WIRE.
Birmingham wire-gauge. Clark (L.), 1867, '69.
English wire-gauge. Hughes (T.), 1879.
Imperial Standard Wire-Gauge. Table of sizes and breaking strains, 1884. Iron and Steel Wire.
International wire table. Boult (W. S.), 1890.
Metal wire, changes of temperature during stretching. Forchheimer, 1885.
—— Torsion and detorsion caused by changes of temperature. Wassmuth, 1890.
Steel wire of high tenacity. Percy (J.), 1886.
Wire-drawing gauge and unification of threads. Société d'Encouragement, 1894. Add. 534.
Wire-drawing mill, unification of gauge. Richard and others, 1893.
Wire manufacture and uses. Smith (J. B.), 1891.
Wire Fencing applicable to Railway purposes. Young (C. D.), 1850.

WIRE ROPE TRANSPORT. *See* ROPEWAYS.

WOOD. *See* TIMBER.

WOOD CARVING. POLLEN, 1885; LELAND, 1890, '94.
Burmese. GORDON (R.), 1882.

WOOD-WORKING MACHINERY.
Exercises in wood-working for handicraft classes in elementary and technical schools. UNWIN (W. C.), 1887.
Joints in Woodwork. ADAMS (H.), 1877.
Patent Universal Joiner and Wood-shaping machine. THOMPSON (—), 1860.
Wood Conversion by Machinery. RICHARDS (J.), 1876.
Wood-working Factories and Machinery. Their arrangement, etc. RICHARDS (J.), 1872, '73, '85.
Wood-working Machinery. BALE, 1880; HUTTON (F. R.), 1888; RANSOME (J. S.), 1889.
Wood-working Tools and how to use them. WHITAKER (C.), 1881.

WOODITE and its uses. REED (Sir E. J.), 1888.

WOOL. BEVAN (G. P.). Industries, vol. 5.
Balance of a new construction supposed to be of use in the Woollen Manufacture. LUDLAM (W.), 1766. App. 566.
Wool dyeing. Lectures. JARMAIN, 1876.
Wool Machinery. NEFTEL, 1880.
Wool Machinery for preparing, roving, and spinning. BODMER (J. G.), 1835.
Wool Manufacture. Report. BOND (G. M.), 1883.
Woollen trade and manufactures. Hints for the extension and improvement of. ANONYMOUS, 1780. Add. 481.
Great Britain, Wool and woollen manufactures of. SAMUEL Bros., 1859.
New Zealand. Exports, 1871–72. NEW ZEALAND, p. 413.
Yorkshire, Woollen Trade of. BAINES (T.), 1871–77.

WORKHOUSES (LONDON). Report on thirty-eight Metropolitan Workhouses. LONDON, p. 274.

WORKING CLASSES.
Reports on the Sanitary Condition of the Labouring Population of Great Britain, 1842–43. PARLIAMENTARY..Papers, p. 521.
Workmen's Cities. DOLLFUS, 1857.
Workmen's Earnings, Savings, and Strikes. SMILES (S.), 1861.
Nassau Working Classes, Condition of. TWINING (Thomas), 1853.

WORKMEN'S DWELLINGS. *See* HOUSING OF THE WORKING CLASSES.

WORKSHOPS.

Administration of, public and private. METCALFE (H.), 1885.
Design and constructions. BARNETT (J. D.), 1889.
Instruction. KICK, 1887.
Workshop. Companion for tin, sheet iron, and copper-plate workers. BLINN, 1869.

WORKWOMEN. Hygienic case of workwomen and their children. BLUHM, 1894. Add. 486.

WRECKS.

British Isles, on the shores of the, in 1850. NORTHUMBERLAND.
"Edward Eccles," raising of, sunk in the Thames in Jan., 1886. "EDWARD ECCLES," ss., 1886.
Excavations for Ship-lifting Works. POETSCH, 1889.
"Gorgon," H.M.S., Recovery of, stranded in the Bay of Monte Video, 1844. KEY (A. C.).
Indian Waters, 1877. CARRINGTON (R. C.), 1877–82; INDIA, p. 109.
—— Wreck Chart, 1864–65. INDIA, p. 109.
Method of raising sunken vessels, with a detail of the raising of H.M.S. "Pincher." SADLER (F. W. R.), 1838.
"Orion," the "Amazon," and the "Birkenhead," Loss of the. LACON, 1852.
Proposed company for the recovery of sunken vessels and other submerged property. SMITH (Stephen R.), 1855.
Report and Minutes of Evidence on Shipwrecks of timber ships, 1839. PARLIAMENTARY..Papers, p. 521.
Report and Minutes of Evidence on Shipwrecks, 1843. PARLIAMENTARY..Papers, p. 521.
Returns, Abstract of, to Board of Trade of Shipping Casualties, 1872–78, etc. PARLIAMENTARY..Papers, p. 521.
Russian frigate, "Alexander-Newski." CIALDI, 1869.
South-eastern coast of England. PORTWINE, 1849.
Submarine researches on the Wrecks of H.M. ships "Royal George," "Boyne," etc., in Deane's improved Diving apparatus. DEANE (C. A.), 1836.
Table Bay Wrecks and Disasters, Report of inquiry into. TABLE BAY, 1878.
"Thetis," H.M.S., Operations for the recovery of the public stores and treasure sunk in. DICKINSON (T.), 1836.

WRITING (SECRET) New mode of. ANONYMOUS, 1829, p. 50.

Y.

YACHTS.

"America" Yacht. Queen's Cup won in 1851.
Evans (W. W.), p. 396.

Laws governing yachts in American waters. Kunhardt, 1887.

Small yachts, design and construction. Kunhardt, 1885.

Steam engine applied to Yachts. Kunhardt, 1887.

Steam yacht "Siesta," hull, engine and boiler. Isherwood, 1883.

Steam yachts and launches. Machinery and management.
Kunhardt, 1887.

Yacht designing. Kemp, 1876.

Z.

ZENITH DISTANCES.

Discordance between results obtained by direct observation and those obtained by observation by reflection from the surface of quicksilver. Airy (Sir G. B.), 1863, p. 20.

Instruments adapted to the measure of small meridional Zenith Distances. Airy (Sir G. B.), 1849, p. 19.

ZINC. Bevan (G. P.), Industries, vol. 1.

Alloys, Zinc. Storer (F. H.), 1860.

Application of Zinc for covering houses, railway stations, platforms, etc. Braby and Co., 1869.

Impurities of commercial Zinc. Eliot and Storer, 1860.

Manufacture (Zinc). Sopwith (T.) and Richardson, 1864.

Metallurgy. Muller (A.), 1862 ; Muller and Lencauchez, 1861 ; Percy, (J.) 1861.

Patent metallic colours prepared from the Zinc of Vieille Montagne. Brown (F.), 1851.

Proportion of Zinc in Zinc Ores. Laur, 1875

ZINC WORKS on the Continent. Causes of failure in England. EDMESTON, 1860.

Vieille Montagne Company. Zinc from the Mines, foundries and works of the Company situated in France and Belgium. VIEILLE Montagne Co., 1851.

ZOOLOGY.

Elements. EDWARDS (A. M.), 1843; MILNE-Edwards (A.), 1843. Add. 520.

Forms of animal life. ROLLESTON (G.), 1870.

History, habits and instincts of animals. BRIDGEWATER Treatises, 7.

Manual of Zoology. MILNE-Edwards (A.), 1856. Add. 521.

Birds, Wings of. FLOWER (Sir W. H.), 1886.

Mammalia, recent and extinct. SCOTT (A. W.), 1873.

—— Glossary of Fossil Mammalia. GORE (J. E.), 1874.

Whales, past and present. FLOWER (Sir W. H.), 1883.

Alaska, Seal Islands of. ELLIOTT (H. W.), 1882.

Australia. Mammals. KREFFT, 1871.

—— Snakes. KREFFT, 1869.

—— Vertebrata, fossil and recent. KREFFT, 1871.

Aveiro, Maritime Laboratory of. MELLO de Mattos (J. M. de), 1894. Add. 520.

Colorado. Insects of special interest from Florissant, Colorado. SCUDDER (S. H.), 1892.

Dakota Territory. Birds of Fort Sisseton. MACCHESNEY, 1879.

—— Mammals of Fort Sisseton, Dakota Territory. MACCHESNEY, 1878.

—— Collection of Fishes made in Dakota and Montana. JORDAN (D. S.), 1878.

—— Herpetology of Dakota and Montana. COUES and Yarrow, 1878.

Great Basin. Quaternary and Recent Molluska of the. CALL, 1884.

Gulf Stream at great depths, Fauna of the. POURTALÉS, 1868.

New Zealand Coleoptera, 1880–93. BROWN (T.); NEW ZEALAND, p. 409.

—— Diptera, Orthoptera, Hymenoptera, 1881. NEW ZEALAND, p. 409.

—— Fishes, 1872. NEW ZEALAND, p. 409,

—— Molluska, 1880. NEW ZEALAND, p. 409.

Victoria. Prodomus. McCOY, 1885

LONDON:
PRINTED BY WILLIAM CLOWES AND SONS, LIMITED,
DUKE STREET, STAMFORD STREET, S.E., AND GREAT WINDMILL STREET, W.

Z 5854 I57 Index v.2

Institution of Civil Engineers, London. Library
Catalogue of the library

PLEASE DO NOT REMOVE
CARDS OR SLIPS FROM THIS POCKET

UNIVERSITY OF TORONTO LIBRARY